THE MOX PLANT CASE

BETWEEN

IRELAND — Applicant

- and -

THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND — Respondent

- - - - - - - -

THE JAPANESE ROOM
THE PEACE PALACE
THE HAGUE
THE NETHERLANDS
TUESDAY 10TH JUNE 2003

- - - - - - - -

BEFORE:
THE TRIBUNAL:

HE JUDGE THOMAS A MENSAH (President)
Prof JAMES CRAWFORD SC
Matre L YVES FORTIER CC QC
Prof GERHARD HAFNER
Sir ARTHUR WATTS KCMG QC

- - - - - - - -

PERMANENT COURT OF ARBITRATION:
Ms Anne Joyce (Registrar)
Mr Dane Ratiff (Assistant Legal Counsel)

- - - - - - - -

PROCEEDINGS DAY ONE
(Revised)

- - - - - - - -

Transcribed by Harry Counsell & Co.
(Incorporating Cliffords Inn Arbitration Centre)
Cliffords Inn, Fetter Lane
London EC4A 1LD
Tel: 44 (0) 207 269 0370
Fax: 44 (0) 207 831 2526

- - - - - - - -

A P P E A R A N C E S

FOR IRELAND

Mr David J O'Hagan (Agent for Ireland)
Ms Christina Loughlin (Deputy Agent)

Mr Rory Brady SC (Attorney General)
Mr Eoghan Fitzsimons SC (Counsel)
Mr Paul Sreenan SC (Counsel)
Prof Philippe Sands QC (Counsel)
Prof Vaughan Lowe (Counsel)

Office of the Attorney General
Mr Edmund Carroll (Advisory Counsel)
Ms Anjolie Singh (Advisory Counsel)
Mr Loughlin Deegan (Advisory Counsel)

Office of the Chief State Solicitor
Ms Anne O'Connell

Department of the Environment and Local Government
Ms Renee Dempsey
Mr Peter Brazel
Mr Frank Maughan
Ms Emer Connolly

Department of Foreign Affairs
Mr James Kingston
Mr Declam Smyth

FOR THE UNITED KINGDOM OF GREAT BRITAIN AND NORTHERN IRELAND

Mr Michael Wood CMG (Agent for the United Kingdom)
Mr Douglas Wilson (Deputy Agent)

The Rt Hon the Lord Goldsmith QC (Attorney General)
Dr Richard Plender QC (Counsel)
Mr Daniel Bethlehem QC (Counsel)
Mr Samuel Wordsworth (Counsel)
Prof Alan Boyle (Counsel)

Advisers
Ms Cathy Adams (Legal Secretariat to the Law Officers
Mr Jonathan Cook (Department of Trade & Industry)
Mr Brian Oliver (Department for Environment, Food and Rural Affairs)
Mr Jolyon Thomson (Department for Environment, Food and Rural Affairs)

THE PRESIDENT: These hearings are being held pursuant to the timetable envisaged in accordance with the rules of the Arbitral Tribunal, and the arrangement and schedule determined by the Tribunal in consultation with the parties. It is agreed that the hearings may continue up to, but not beyond, 27th June 2003. The first week, between 10th and 14th June, is available for the presentation by Ireland. The United Kingdom's presentation will take place during the second week, that is between 16th and 21st June. The parties will present their replies during the third week, between 23rd and 27th June.

Following the consultations between the Tribunal and the parties, it has been decided to maintain the arrangements and the schedule previously agreed. However, the Tribunal has requested Ireland at an early stage in its presentations this week to address the issue of jurisdiction that has been raised by the United Kingdom in its communications of 29th May and 5th June, to which Ireland responded in its letter of 6th June.

Following Ireland's submissions, the Tribunal may, if it considers it necessary, afford the opportunity to the United Kingdom to respond. The Tribunal will at that point take a decision with regard to the subsequent proceedings.

I now invite the agent of Ireland to note the representation of Ireland.

MR O'HAGAN: Mr President, Members of the Tribunal, my name is David O'Hagan. I am agent for Ireland. Firstly, I would like to thank the President and Members of the Tribunal for agreeing to act as arbitrators in this case. I would also like to thank the Permanent Court of Arbitration for the administration of the hearing and for the arrangements leading to it. I am pleased to introduce the members of the Irish legal team, who will be presenting oral argument. After these introductions, the Attorney-General, Mr Rory Brady, will open Ireland's case and will deal with the introduction and an overview of the history and nature of the dispute of the Sellafield site, the MOX and THORP connection and Ireland's concerns. This will last approximately two hours. The Attorney will be followed by Mr Eogham Fitzsimons, Senior Counsel at the Irish Bar, Mr Sreenan, Senior Counsel will follow, Professor Philippe Sands and Professor Vaughan Lowe will follow on subsequent days.

THE PRESIDENT: Thank you very much indeed, Mr O'Hagan. I now invite the agent of the United Kingdom to introduce the representation of the United Kingdom.

MR WOOD: Mr President, Members of the Tribunal, it is an honour for me to appear as Agent for the United Kingdom in this the MOX Plant case, before this distinguished Tribunal. The United Kingdom's Deputy Agent is Mr Douglas Wilson of the Foreign and Commonwealth Office. Appearing as counsel, we have the Attorney General, the Rt Hon the Lord Goldsmith QC, Dr Richard Plender QC, Mr Daniel Bethlehem QC, Mr Samuel Wordsworth and Professor Alan Boyle.

Mr President, as advisers we have Ms Cathy Adams, Mr Jonathan Cook, Mr Brian Oliver and Mr Jolyon Thomson. I thank you, Mr President.

THE PRESIDENT: Thank you very much indeed. At this stage, as agreed, I will invite Ireland to commence its presentation and I call on Mr Brady, the Attorney General.

MR BRADY: Thank you, sir. First, I may say that it is a great honour on my behalf and on behalf of the legal team

that I lead to be appearing before this distinguished UNCLOS Tribunal. There are a couple of logistical matters that I would like to deal with, which I think will help the process of opening this case. What you are being given at the moment are folders which I will go through presently and which will constitute much of my opening. We are also making copies available to the United Kingdom team. I will wait until you receive those folders.

If I could start off by saying that in relation to these folders there are a number of aspects of them which create some difficulties which will have to be dealt with at an earlier phase of this opening. I would ask you to go to the index to the submissions, page 2, and specifically to go to section 8. You will see section 8(III), the heading Some Illustrations, and this deals with part of our case under the rubric cooperation and coordination. I am going to take solely the members of the Tribunal and the English team to two or three pages and explain presently what I intend to do in respect of those pages. If you will bear with me for a moment you will understand what I am at. I would ask you to go to page 31. With some regret unfortunately the highlighting has not come out with the greatest of clarity, but you will see a kind of grey backdrop to the section I which I am not going to read out at this stage. If you then go to the next page which I hope has come out with some degree of grey vagueness, and hopefully that greyness will not affect the rest of my submission. If you move on to the top of page 33 again vague greyness. Then page 34, VI. Again you see the topic and again you will see this ineffective blur of greyness which follows through for a couple of pages, ending on page 36. These are matters I do not think I need explore here because yesterday I indicated there would be certain aspects of the case which I would deal with at the end of my opening even though logically they come in the middle of the sequence. It is really logistically to facilitate everyone that we have engaged in this exercise and I will not be addressing that at this phase of my opening. I hope that meets the requirements of everybody to maintain a degree of confidentiality to which both sides are entitled in an arbitration such as this.

The next issue I want to touch upon very briefly is this. These are by way of general comments. If there is one thing that Ireland and the United Kingdom can agree on about this case it is that the pleadings have been voluminous, to put it mildly, and I think that is a reflection of the degree of complexity of the issues that are involved. But if they were voluminous I think it is a testimony to both counsel on both sides that they have certainly assisted in identifying the issues and refining the issues that Sirs, you, this Tribunal, will have to resolve, and I certainly hope that consistent with that process to use my opening not to confuse further but to try and elucidate and to try and crystallise the justiciable controversy that exist, but I think in the heel of the hunt this case may boil down to a relatively small number of issues, and issues that are mainly legal and nature, although against a factual background that will have to be addressed. The issues of conflict in relation to scientific opinion, I will address. Let me assure you presently that I will not be inviting this Tribunal to resolve issues of scientific controversy. Indeed, I believe that it is trite law that Tribunals such as this should not engage in resolving issues of scientific debate and, a fortiori, where it is in an area of evolving scientific knowledge.

If I can, so to speak, mention that warning at the commencement of my opening address and then move on to deal with the issues.

As I said, I hope to use my opening to crystallise as best I can what are the outstanding issues in this litigating. I would invite you, sirs, to go through the submission that I just handed in where I hope to set out in as fair and as comprehensive fashion as I can Ireland's perception of what are the issues in this arbitration. Again, to express our appreciation to have the benefit of such a distinguished panel of arbitrators.

If you go to page 4 of the submission, you will see that I address the history and the nature of the dispute. I start off with the observation that the nature of this dispute is one about the extent, nature and effect of obligations and rights arising under UNCLOS. I think that if you start off from that perspective, many of the factual issues on which we have engaged in the pleadings fit into a neat box which can be categorised as what are the extent of the obligations and the duties of the United Kingdom and, correspondingly, what are the rights of Ireland in relation to this dispute. Of course, this dispute is concerned with the preservation and protection of the marine environment and, specifically, of course, the Irish Sea.

We seek, as is clear from 1.01 a determination of justiciable issues before this Tribunal in the context of the operations of the nuclear facility at Sellafield and, in particular, the radioactive discharges at Sellafield.

Before I make some further general comments in relation to our case concerning the Irish Sea, I think that it is only fair to make a number of other observations. Ireland and the United Kingdom have good and friendly relations. Our two governments are cooperative at a variety of levels. We are members of the European Union and the European Community. We have got to a situation where we have ended up before this Arbitral Tribunal to have our disputes being resolved. Ireland is not in the business of suing and litigating against friendly states, so one readily asks the question, why are we here? I think that, if I was to identify one particular theme or aspect of our case that is a common threat of that case, it is that Ireland is here because Ireland and the United Kingdom do not share a common perception of the nature and extent of the rights of Ireland and, thus, the obligations of the United Kingdom under UNCLOS, hence this arbitration.

This case did not occur out of the blue. Ireland did not wake up one morning and decide we are going to sue the United Kingdom. There is a history here of Ireland engaging with the United Kingdom in respect of a variety of complaints relation to the MOX plant and Sellafield in general. I just briefly want to touch on those because I think that it sets a useful historical context.

Commencing with the application for planning permission for the MOX plant, I think in 1993, Ireland then made known its objections. It is of some significance that one of those objections articulated at that stage in a written submission by Ireland was the inadequacy of the environmental statement submitted on behalf of BNFL to Copeland Borough Council. Copeland Borough Council is the statutory body with powers in relation to the grant and refusal of planning permission or I think that it may be called sometimes planning consent. We also raised our concerns about the extent to which the process of justification of the plant operations, which was required by EURATOM was carried out properly. I just mention explanation passant the fact that it was of concern to that economic justification to Ireland that the capital costs of construction, a sum in excess of £400 million, were treated as sum costs and they were effectively treated as such when the economic aspect of the justification process was taking place.

But we did not just rest our case there. The United Kingdom operated five separate grounds in

relation to the justification process. Some of them arose because of an incident, to which I will come in a moment, of data falsification at the MOX demonstration facilities, others arise in the context of developments that were taking place. Ireland made representations and submissions during the course of the five phases of that justification process. You will see, sir, at the top of page 5, that I go on to set out how it is that after making various submissions, having made a variety of representations, both to the relevant agencies and, indeed, government to government level, Ireland reached the stage where it felt that its rights and its entitlements were not being respected. I say that with the greatest of respect to Her Majesty's Government. We were then in a position where we took a view that the only way in which Ireland's rights and entitlements could be respected was by having a judicial determination before an international forum which established the nature and the extent of our rights. Let me say at the outset. This process is mutually beneficial. It is of benefit both to Ireland and the United Kingdom to have a distinguished panel, such as yourselves, decide upon these issues, determine and declare these issues in relation to rights and entitlements, so that it prescribes the level and nature of conduct for the future, because the future, in terms of the operation of MOX and Sellafield is as important to Ireland as the past.

I now want to add one further qualification, which I address at paragraph 1.04 of my opening. That is, so to speak, deal with the negative declaration. Ireland is not seeking a declaration from this Tribunal that the United Kingdom were wrong in its perception to have made the decision many, many years ago to opt for the perceived benefits of nuclear power. That was its political decision. But what we are concerned with are the consequences of the implementation of that political decision and the duties imposed on the United Kingdom in terms of those consequences and in terms of authorising the MOX plant and its effect in terms of extending the life of various activities at Sellafield with the concomitant discharges of waste containing radioactive materials into the Irish Sea, the sea that Ireland and the United Kingdom shares. I want to say at the outset the limit of our case, so that it is clear the extent to which we are seeking relief before this Tribunal.

I will now address, moving on to paragraph 1.05 of my submission, Ireland's right. I start off by stating the proposition which we say cannot really be gainsaid, but would appear to be an issue. To discharge radioactive materials into the Irish Sea is, we contend, to place a pollution burden on that sea. I will come back at a later stage in my opening to adumbrate what is the current load of pollution in the Irish Sea deriving from the historical level of discharges.

The United Kingdom does not accept the existence of that burden, primarily because of its focus on the radiation dose received by humans as a result of these charges. I will revisit that issue in greater detail, because it is certainly a theme that runs constantly and currently throughout the extensive case made on behalf of the United Kingdom. We say that its perception and its view of the problem with pollution and discharges through the prism of the radiation dose on humans is where we have parted company with the United Kingdom some time ago.

I now address what we say are the essential rights possessed by Ireland, and they essentially reduce themselves to three proportions which I have outlined on page 5. I will read out what those propositions are which we say represent Ireland's rights under UNCLOS. I emphasise "under UNCLOS".

(a) the right to receive effective cooperation from the United Kingdom and coordination of the two

States' activities;

(b) the right to be informed of the results of an UNCLOS-compliant assessment of the potential consequences of the operation of the MOX plant and related facilities at Sellafield; and

(c) the right to ensure that the United Kingdom prevents, reduces and controls pollution.

I will deal in a more substantial way with each of those seriatim. I will now address the Irish Sea. My colleague, Mr Eogham Fitzsimons, when making his submission, give greater detail in relation to the Irish Sea and its various features that are relevant to this case, but for the moment I wish to make some general comments in relation to the Irish Sea, its relevance to Ireland and, therefore, the bedrock of our concerns in relation to what we say is continuing pollution of the Irish Sea from Sellafield.

1.06 It is, sirs, a semi-enclosed sea. It is a resource available to the people of Ireland, the United Kingdom and elsewhere. It is of value both as a recreation resort and in terms of its economic impact. Thus, for instance, in 1998 an estimated 42,600 tonnes of fish species (including shell fish) were landed by Irish fishermen from the commercial operations in the Irish Sea. This had a value of 72 million euro. A significant proportion of the Irish population resides on the east coast of Ireland. Tourism is an important part of the economic life of Ireland and the resource that is the Irish Sea contributes to that. Both Ireland and the United Kingdom in 1977 claimed 200 mile zones. However, the formal boundary for fishery control purposes is the median line between Ireland and the United Kingdom. Ireland has a clear and direct interest in relation to the preservation of that sea.

I move on from stating what is relatively general information to deal now in a broad way with the Sellafield site, the activities on the Sellafield site that occur and I will then in the next section of my opening spend some time exploring an issue in this case, being the MOX/THORP connection, the two separate plants. If I may say at the outset, the MOX/THORP connection is in many respects the centre of gravity of this case.

I will now deal with the second section of my opening, which is the Sellafield site and, again, I hope some useful background, historical data.

The site at Sellafield is in Cumbria, England and it is operated by British Nuclear Fuels, which I refer hereafter as BNFL. Prior to BNFL taking over, control and operation of the site was previously run by the UK Atomic Energy Authority. Nothing turns on that and I will refer to both of those bodies collectively as BNFL for the purposes of convenience.

The site is located 184 kilometres from Ireland. It is a site, we think, of approximately about 480 acres in size. It was formerly known as Windscale. Since, we think the late 1940s/early 1950s, various nuclear activities have been taking place on site.

I now propose to outline in a broad way what those nuclear activities have been since the inception of work on that site. I start off, firstly, at (a) on page 6.

(a) it was involved in the production of plutonium for military purposes at the facilities known as the Windscale Piles;

(b) the operation of commercial nuclear power reactors at Calder Hall comprising four Magnox reactors - the last of the Magnox reactors ceased power production in March 2003, but all of the nuclear fuel

remains in the reactors and is expected to so remain for the foreseeable future;

(c) the reprocessing of spent fuel from Magnox reactors. This is carried out at a reprocessing plant (B205) at Sellafield. This plant was - and continues to be - engaged in the reprocessing of Magnox fuel - I want to emphasise that. Where one sees B205 that is involved in the reprocessing, but only of Magnox fuel. This Magnox fuel comes from Sellafield and other Magnox reactors which are operated off site and owned by BNFL.

The third principal activity that has taken place during the life time of the operations of the Sellafield site was that of nuclear waste management and decommissioning.

The fourth and fifth issues which I will present address are perhaps the most important activities taking place on the site. I will briefly describe them at this stage. They are oxide fuel reprocessing at THORP. This involves reprocessing spent nuclear fuel from nuclear power plants located in and outside of the United Kingdom and that are owned by various power utilities. It is another reprocessing activity. Of course, this one is not concerned with reprocessing Magnox fuel, but other types of spent nuclear fuel.

The fifth cardinal feature of the activities on site is MOX fuel manufacturing. This involves using plutonium, that is, in fact, obtained from the THORP process, and uranium to manufacture Mixed Oxide Fuel, and, indeed, hence its name.

I now address the fourth and fifth elements of these operations separately.

THORP

Nuclear utilities generate, from their reactors, spent fuel. This spent fuel (sometimes referred to as irradiated fuel) essentially contains three elements or classes of elements, uranium, plutonium and fission products, otherwise referred to as wastes. I will come back to visit those wastes in a moment as they are of some importance to this case.

What does an operator of a power utility, using a nuclear reactor, do? The options available to an operator of a power utility are essentially reduced to two broad propositions. After some interim storage for cooling, the following are the options available for the treatment of spent nuclear fuel, and the spent nuclear fuel, briefly, is when the fuel rods, containing the uranium, have reached the end of their effective useful life, which can be three to five years, through the whole process of being used to generate heat, to generate steam, to generate turbines, to generate electricity, it reaches a point where the level of wastes in the nuclear fuel that has been installed into the reactor get to a point where it is more efficient to take out the fuel after this three to five year period - or maybe four-year period - and, when you take that out, that is when you end up with this tripartite division of uranium, plutonium - and plutonium is generated in the course of operating a power plant - and, thirdly, fission products or waste.

The power utility is inevitably confronted with the difficulty of what do we do with this spent or irradiated fuel? Its two primary options, after some interim storage and cooling, are long-term storage and disposal or reprocessing. We, of course, are concerned in this case solely with the latter option, and it is reprocessing that THORP was concerned with.

I will now deal briefly, again with the health warning that I hope not to get into any level of science, which certainly would be beyond my abilities, but to try to outline as best I can the nuts and bolts of the

operation of a reprocessing plant in a general way.

Essentially, what happens is that the spent nuclear fuel that is delivered, for instance to THORP, is dissolved in a nitric acid bath, through a series of complicated steps which I intend to avoid discussing at this stage. The spent fuel is dissolved and eventually is broken down into the three elements that are contained in the spent fuel and separated into its three elements. The spent fuel when it arrives consists of this body or group of elements but what then happens is that through reprocessing they are broken down into what I would call colloquially I suppose three separate streams, and you have the uranium stream, a plutonium stream and the waste stream.

In essence that is the effect of the reprocessing. I hasten to add it a lot more complex than my very brief description of the substance of how it works and I suppose it is really mpg layman's analysis of it but that is in substance how it operates.

I now move on to the other plant that is at the heart of this case and that is the MOX plant. We take the position on site after reprocessing with uranium, with plutonium and plutonium is generated while the nuclear fuel is in the reactor. It comes out of the radiated fuel and the wastes. What is the function or purpose of MOX? MOX as I said in my earlier brief description of it is mixed oxide fuel. It is essentially a mixing to a complicated process that Mr Fitzsimons will explain when he is addressing you. It involves a mixing of uranium and plutonium. The uranium that is used can come from the uranium that has been separated or it could be a fresh supply of uranium. We do not have to go into that level of detail.

Just to give some historical perspective in MOX, for approximately 30 years at a very low and we think at an experimental level MOX in fact has been manufactured at Sellafield. One of BNFL's competitors, Cogema, has since 1955 been manufacturing MOX. It is also manufactured in Belgium.

We now come to the next phase in relation to MOX when we see the start of two projects connected with MOX, and I will deal briefly with them and spend some time on them because they surface again throughout the opening of Ireland's case.

In 1993 BNFL constructed the MOX demonstration facility, and I just want to make it clear that there is a difference between the MOX demonstration facility and the subsequently constructed MOX plant, which finished construction in 1996. The MOX demonstration facility continued operating up and until 1999. Its capacity for manufacture is significantly less than the MOX plant. Its design capacity for manufacture is of the order of 8 tonnes of MOX per annum. You will see at paragraph 2.03 of my opening my observation that the MOX demonstration facility continued operating up until 1999. In fact Ireland discovered by the pure fortuity of looking at the Official Journal of the European Community that the United Kingdom had in the recent past applied to recommence a level of operations at the MOX demonstration facility, it having ceased operations in 1999, and they intend to recommence a level of operation. Ireland was never told about that and I will come back to deal with that in the context of cooperation.

I now deal with the MOX plant which is the principal area of our concern. As I have already said the MOX plant was constructed in 1996. It has an operating capacity of 120 tonnes of MOX per annum. I briefly describe how it functions.

Through what is essentially a dry process it converts separate plutonium - that is the plutonium

which I previously referred to as being separated through the separation process at Thorp with uranium and it is then manufactured into MOX pellets. These are then contained in fuel assemblies that are intended for delivery to overseas customers of BNFL for use as fuel in their reactors. So it is so to speak a process of creating another form of nuclear fuel that is then available for subsequence use in certain types of reactors of power utilities who are in the nuclear industry.

I want to make one statement of fact now that is of some importance, and it is this. All of the plutonium used in the manufacture of MOX fuel in the MOX plant must be derived from the plutonium separated at Thorp, and that is a requirement of the licensing conditions imposed on BNFL by the United Kingdom Environment Agency. It is an important condition and particularly it is important in the context of the connection and inter relationship between MOX and Thorp and I related that when dealing with this central gravity issue.

The third element of the reprocessing activity that is germane is that of wastes. There are different levels of waste that are generated, and I propose again to deal very briefly, because I think it is unnecessary to go into any detail in the sciences of this. But I want to address what happens to the wastes, or as I have colloquially described it, the third stream, of wastes that come out of Thorp reprocessing. Not unlike the reprocessing at the 205 Magnox fuel, high level wastes are generated through this process. These high level wastes, and they contain highly active liquors, are stored in highly active storage tanks, and you will see at paragraph 2.04 my reference to this. They are described again somewhat colloquially as the HAST tanks. This is another feature of Ireland's case that will surface throughout our opening and throughout the evidence, and it is an important part of our case and it is important in the context of the two issues I referred to right at the outset and I will deal with at a later stage in my opening. But it is high level wastes which are stored in the highly active storage tanks which are referred to as the HAST tanks. There are 21 of the HAST tanks on site. They are not all constantly or currently in use. Some are held in reserve for reasons of being available to store material. The HAST tanks are involved in a complicated process of ensuring that the highly active liquors are properly stored and safely stored.

What happens to the waste? There are in addition to the high level wastes other levels of waste which are generated through the Thorp process. What happens to them? This really is where we get to the genesis of our concerns in relation to MOX and Thorp. Those wastes after a series of treatments on site are then discharged into the Irish Sea, They are discharges via pipelines which as we understand it extend approximately 2.5 kilometres out into the Irish Sea. These wastes that are so discharged into the Irish Sea as an operation and constant part of the functioning of Sellafield and the reprocessing at Thorp, and indeed to some extent but to a much lesser extent MOX contain radioactive materials. So the volume of fluid that is discharged into the Irish Sea containing these wastes contains radioactive material. There are also aerial discharges from the physical structures on site and these aerial discharged emanating from Thorp and MOX also make their way into the Irish Sea. They are not relatively speaking the largest source of the discharge of radioactive materials but they are nonetheless another source.

The discharges from Sellafield and Thorp and the discharges that have or are to take place in respect of MOX are the subject of authorisations from the UK Environment Agency.

That is so to speak a thumbnail sketch of the operation of nuclear facilities at the Sellafield site and more specifically concentrating upon those activities the subject of the proceedings that result in the discharge of liquids containing wastes, containing radioactive materials.

I have already adverted to the fact that the level of discharges from the MOX plant as we understand it is to be operated, and is the subject of a licence from the Environment Agency, is not of a significant magnitude; relatively speaking the discharges from the Thorp plant of radioactive materials is of a significantly greater magnitude. One of the issues that has constantly recurred throughout the pleadings is that the level of discharges from MOX have been described from time to time in terms of radiation doses, in other words as vanishingly small. We do not accept that description. But where we say the United Kingdom has with respect to the United Kingdom fallen into error, to use that neutral phrase of the courts, is in not immediately and not almost instinctively while engaged in the authorization and justification process, recognising that they needed to take into account the discharges both from MOX and Thorp. One of the issues of fact that is ventilated time and time again is that of the non-existence, the non-interdependence, the non-intimate connection between MOX and Thorp. The reason for that is clear. The United Kingdom's case may very well stand or fall on their ability to have a cordon sanitaire between MOX and Thorp. That is why I said at the outset this may very well be the centre of gravity of the case, because many of the United Kingdom's points of defence fall if there is such a connection. Not all our points are connected to it, but a substantial number are.

With your permission at the risk of going into detail that would be unexciting I propose to spend some little time addressing the MOX Thorp connection. My friend Mr Fitzsimons will also revisit this issue because of its significance. I start off this aspect of the opening by not simply setting forth Ireland's view of the fact, but rather I want to look at what has the United Kingdom said about the relationship between MOX and Thorp. What comments have BNFL and agencies in the United Kingdom articulated in respect of the MOX Thorp connection? Reprocessing contracts with nuclear utilities in England or abroad result in reprocessing. There is an immediate problem. Do they have to bring all of their separated materials, plutonium, uranium wastes, back? And particularly separate plutonium is a matter of huge concern to the international community. What is to happen. MOX is there is convert the separated plutonium. That which is of greatest political controversy, that which is of greater security concern, separated at Thorp, owned by the customers. It is not owned by BNFL, it is owned by their customers. Do they take it back, do they ship through the seas across the world with all of its vicissitudes and all of the political risks and criticisms to which they will be subjected; or do they convert it into MOX and use the plutonium along with uranium, perhaps fresh uranium from Springfield to manufacture MOX pellets. That shows the inter relationship. But I now address the words of the United Kingdom , and then let us look at what their position is, because you will have seen it from the pleadings. I will take you through the extracts from the documents which I have set out in this part of my opening; rather than referring to the documents and pulling them out one by one I have actually extracted for the Tribunal the relevant passages and set them out in the course of my opening.

What I propose to do at the risk of being somewhat repetitious is to take you through the words of the United Kingdom, its agencies and BNFL. I would ask you to go to page 9 of my opening submission. I

make the assertion at the commencement of this introduction that the United Kingdom has proceeded to permit the MOX plant to proceed whether thought justification or the grant of an authorization. It has done so we say without any proper appreciation and by failing to acknowledge and address the impact that the MOX plant will have on the Thorp operations. I will come to a very simple proposition. If you have a relatively small level of discharges from MOX but a much higher level from Thorp, clearly the extent of the discharges into the Irish Sea depends upon the extent to which MOX has an affect on the level of activity of the prolongation of the level of activity of Thorp, and that is really our case in a nutshell.

Creating that nexus or that link between those two facilities is creating a link between the level of discharges, the greater level in Thorp, and the greater level in MOX, and I will come on to deal with how there is a causal relationship between the MOX plant and the extended level or life of operations of Thorp; and therefore you must view the discharges in terms of discharges from both MOX and Thorp.

I will now set forth, Sirs, having spent some more time than I expected introducing this issue, the UK's evidence, and we rely on this evidence to prove our case. Paragraph 3.02, having referred to the UK documentation and evidence I go on and make a number of quotes from documents.

(1) In the United Kingdom Parliament Office of Science and Technology paper on MOX April 2000, it is stated that MOX production is seen by BNFL to be an inherent part of reprocessing. An inherent part of reprocessing.

(2) I have already referred to the fact that there was an application for planning permission in 1993 for the MOX facilitate. I am sure, sirs, that you are aware that the planning process involves planning inspectors preparing reports which then go to the relevant council. Let us look at what the planning inspector said when he was looking at this. He said in the course of a report as follows: "Further legal advice was also sought on whether the environmental statement for the MOX plant should also consider the environmental impact of Thorp. There is clearly an economic and physical relationship" - and that is my emphasis added.

The third piece of evidence. During the justification process the Ministers in the United Kingdom Government obtained reports from outside consultants. One of those reports was a report from Little, and he made comments upon contracts for the MOX plant being obtained in future. It is very interesting to note some of the observations contained in his report in the context of the nexus of the link between Thorp and MOX; and he says moving on to page 10 of my opening as follows: (1) Customers of BNFL have expressed a “clear intent” to convert all their plutonium from base load reprocessing contracts, in respect of Thorp, into MOX fuel. (2) From interviews with customers it was “confirmed that there would be little point for them to sign further reprocessing contracts with BNFL if the Sellafield MOX plant did not proceed." I should say one thing I did not clarify at the beginning. This can be slightly confusing. SMP is for Sellafield MOX plant. I refer throughout my opening to it as the MOX plant.

But we can go further. In the OSPAR case of which you are aware an issue in relation to this plant arose. What did the United Kingdom's witnesses say in the course of that case? Dr Geoff Varley, an independent consultant retained by the United Kingdom for that case, dealing with the issues of future contracts, reprocessing contracts, said that "it is likely that some new reprocessing contracts will be signed". That is the reprocessing contracts for THORP. But he then went one step further. In addition, he said, in the

course of the OSPAR case, that the most common forms of contracts for reprocessing - that is contracts for the spent materials going into THORP - were joint reprocessing contracts and MOX manufacturing contracts. So the deal was simple: we will separate and reprocess at THORP and we will make the MOX for you in the MOX plant. They are joint contracts for joint activities and joint processes.

Let us look at the words again uttered by BNFL. They had to produce, as I explained earlier on, an Environmental Statement during the course of applying for the planning permission to Copeland Borough Council. In that, they said as follows:

"In part, the proposals for SMP, as detailed in the application to Copeland Borough Council and described in this Environmental Statement, assume the availability of certain operational facilities within THORP ... The Company [BNFL] recognises that should the consultation result in THORP not becoming operational then the terms of the planning application for SMP may need to be reviewed".

(6) In the course of the planning application to Copeland Borough Council, BNFL stated as follows:

"While the present proposal is physically linked to THORP, it should be noted that if, for any reason, THORP does not become operational the current planning application would be withdrawn and any future plans reviewed by the Company."

(7) BNFL has stated in March 2001, before Ireland commenced any legal proceedings, the following:

"Without the ability to fabricate MOX, BNFL has no proven ability to recycle the plutonium product of reprocessing to customers. Failure to obtain approval for SMP is likely to severely damage BNFL's ability to secure further reprocessing and consequential MOX business and hence valuable export earnings for the UK."

That series of statements, in our respectful submission, demonstrates cogently an admitted functional and contractual and capacity nexus between MOX and THORP.

At 3.03 I observe that it is admitted as a fact that the plutonium to be processed through the MOX plant must come from THORP. As I have already averted, in fact, it is a requirement of the decision of the Ministers of 3rd October 2001 that the MOX fuel manufacturing comes from plutonium reprocessed at THORP. That is the plutonium, which I have said is owned by the customers of THORP. In other words, they cannot bring in plutonium from Belgium, they cannot bring in plutonium from France and manufacture it. They are required to use the plutonium at THORP reprocessed.

I do not rest my case solely in relation to the statements that were made in terms of the relationship or the nexus, commercially or otherwise. We actually go one step further. Again, based on the documentation generated by BNFL, and this relates to the physical interrelationship and interconnection between MOX and THORP. At paragraph 3.04 I have to set out with regret some turgid detail from the outline planning application, but I will proceed through that with some haste.

Siting considerations. I quote from this document.

"There are, however, significant commercial, economic and environmental benefits to be had by physically integrating the two facilities."

Commercial Benefits.

"BNFL believes that the concept of an integrated reprocessing/recycling facility is likely to be attractive both to potential customers ... The incorporation of a MOX fuel manufacturing facility will permit the safe and economically attractive recycling of one of the product streams from THORP"

Economic Benefits.

"The physical integration of SMP with THORP will permit cost savings to be made by comparison with separate stand-alone facilities.

Environmental Benefits.

"The principal environmental benefits of physically integrating SMP with THORP, when compared with separate, stand-alone facilities will be that;

land-take and visual impact is minimised, consumption of energy and raw materials is reduced

The reduced requirement for the transport of nuclear materials noted above also results in an environmental benefit".

SMP's Use of THORP facilities and services

"2. THORP STACK

The highest categories of ventilation extract from SMP will be discharged at high level via new flues installed in the existing THORP stack."

They come out of the same chimney.

"4. THORP Central Control room

The THORP Central Control Room will be used to control and monitor the SMP environmental systems."

"7. Changerooms and Access Control

SMP personnel will enter and leave via THORP. As such, they will utilise THORP changerooms and security control systems."

"SMP will also take certain services, via THORP, from the Sellafield site services ring mains. These services are:

Low pressure stream (for space and process hearing)

Compressed air

Argon

Nitrogen

Hydrogen

Demineralised water

Electrical supplies

In addition .... SMP will receive as a process feed, packaged plutonium oxide powder from THORP via a dedicated transfer corridor."

If you look at it in terms of commercial rationalisation, if you look at it in terms of operation efficiency, if you look at it in terms of physical integration, in our respectful submission, the link and the nexus are overwhelmingly there.

I now move on to a different level and a different dimension of connection between these two

plants, and that is to deal with the issue of contractual commitments.

The United Kingdom has made a very clever argument, if I may say so, in relation to this. The essence of the contention reduces itself to the following proposition.

In relation to certain categories of contracts, baseload contracts, they say that the contracts that we have for reprocessing at THORP contain a commitment by the owner of the spent fuel (that is the power utility, whether Germany, Japan or Switzerland, who sent their spent fuel here) to reprocess and they are obliged to take back their plutonium in a manner that shows a suitable end use. So the case they make, as I understand it, is that, because there are pre-existing commitments to reprocess, that level of activity at THORP is something that will occur by virtue of the contract with the power utility. Therefore, it will not arise in consequence of the existence of the MOX plant. It is a very clever attempt to crack the distinction or the relationship between THORP and MOX, and it requires me to analyse in some detail that particular proposition. I will now address myself to that.

There are essentially two broad categories of contracts, reprocessing contracts, and they fit into this dual categorisation. They are what are called the baseload contracts, which may seem a puzzling term, but there is a very simple explanation. They are the contracts that were in being and that were relied upon as the economic case to justify THORP. That is why they are called "the baseload contracts". They are contracts that were all signed before 1990.

The second type of category of contract is what is described as "the post baseload contracts". That I suppose clearly speaks for itself, they are contracts entered into after that date, and they were not an essential part of the economic case justifying THORP, I hasten to add. They are contracts that were entered into from 1990 onwards.

It is also important to bear in mind the following fact of physical dimension and it is this. Contacts for reprocessing do not necessarily mean that all of the spent fuel has thereby been transshipped to Sellafield, some of the fuels, such as in Germany, continued to remain in Germany, albeit the subject matter of contracts for reprocessing, whether baseload or post-baseload.

I just want to deal briefly with the post-baseload contracts, which are those contracts which are concluded after 1990. Here, if I can at the beginning sound a note of caution, Ireland is giving its understanding of what is the factual situation in relation to the contracts and the terms of the contracts. To some extent, we are in the dark. BNFL, and through it the United Kingdom, has never disclosed to Ireland these contracts. We do not have a copy of the contracts. We do not know the precise terms and contents of those contracts. So, in making this observation at this stage, we are doing the best that we can in setting out our understanding of what those contracts are, based on research carried out by Dr Gordon MacKerron of the NERA Consultancy Group in London. If I may deal with this issue, but subject to that important clarification, that I am speaking to some extent - I will not say in the dark - but I am speaking about contracts where it is unsatisfactory in an Arbitral Tribunal like this or, indeed, in any court case, but I am addressing this Tribunal without ever having seen the contracts.

Dealing with the post-baseload contracts, we believe - and no doubt we will hear more evidence and we will have an opportunity to cross-examine the UK witnesses on this - that they break down into two sub-

categories. Again, I do not want to confuse matters with out choice of nomenclature, but, essentially, we describe those contracts as fixed contracts and requirement contracts. Those labels amount to nothing more than a handy means for us to identify what we believe to be a dichotomy in the types of post-baseload contracts (ie contracts entered into from 1990 onwards). We believe - and time will tell if we are right, and the full details of that will be revealed to us by BNFL in this case - that there are some contracts which were negotiated which provide that, if they are cancelled, you have to pay some form of financial penalty or correction. The second type of contract we believe does not have the same or a similar provision.

I now want to move on to deal with what is actually happening in relation to the post-baseload contracts. They are predominantly with German utilities. I am going to focus in on the conduct in relation to German utilities, because I am going to come to a point, which I think that you should flag now in the interests of clarity, which is this. Rather than there being a binding continuing contractual commitment with financial exposures to damages and so forth, we say that there are species of these post-baseload contracts which can be cancelled and we think can be cancelled without any significant adverse financial consequences. Therefore, we make the next step in our thought process, that, if you have the ability to get out of a contract and not reprocess, you do not have a commitment to reprocess and, therefore, the United Kingdom's case that you are obliged to reprocess and, therefore, MOX does not contribute to the reprocessing is, we say, with respect, not sustainable.

At the top of page 14, I set out that it is an acknowledged fact that German utilities have cancelled some post-baseload contracts. I emphasise the word "some", because the ability to cancel any is important. The fact that they have proceeded to implement those is important. Why? Because what it demonstrates in our respectful submission is a choice in the Germany utility, a choice to reprocess or not to reprocess.

I go on making that point, that it is the very fact of some cancellation that demonstrates that there is no binding contractual commitment that compels the Germany utilities to reprocess post-baseload spent fuel. There is a choice of an option. We think that there is no financial penalty, but we will, undoubtedly, hear more about that in due course. Because there is a choice vested in the German utility, and because both fixed contracts and requirement contracts - one with the penalties and one without the penalties - have been cancelled, the contention of the United Kingdom is with the greatest respect not sustainable as a matter of fact.

But there is one further dimension to this situation, and it arises by reason of events that occurred in Germany between 2000 and 2002 and why we postulate the view, subject to seeing the contracts, that German utilities have a choice or an option to proceed with reprocessing. We then say what is the role of the MOX plant. If you have one contract, one material and you decide to reprocess and the other side not to reprocess, what is the function or role of MOX in relation to that? Do they just simply wake up one morning and say that they are going to reprocess so many contracts and not going to reprocess a whole load of other contracts or is the existence of the MOX plant a factor that influences the decision to proceed to reprocess and then convert the plutonium into MOX pellets for further transportation back to Germany for recycling in their nuclear reactors.

Here I have to deal with some German law and I do so personally with some trepidation to be

referring to German law, so just bear that in mind. It is our understanding and our advice in relation to German law that, as a result of changes culminating in a revision of German law in 2002, reprocessing is only permitted if it can be shown that the resulting separated plutonium can be recycled in Germany. If you opt for reprocessing under your contracts, post-baseload contracts, and you are a German utility, and these contracts are predominantly owned by German utilities, you do not really have much choice, because, under German laws we are advised that you must bring the plutonium back to Germany in a manner that enables it to be recycled. That, in our respectful submission, means that it must come back in the form of MOX. Thus, in so far as German utilities have not exercised the right to cancel post-baseload contracts, there is, in our contention, a causal relationship between the existence of the MOX plant and reprocessing of contract spent fuel at THORP. There is no commitment to reprocess. They choose to reprocess. What we say, undeniably, is that it was the existence of MOX that is causative of that and that enables reprocessing by German utilities, because it enables them to take the spent nuclear fuel that is separated from THORP, take that plutonium, convert it into MOX in the MOX plant and take it back to Germany. We say that on a contractual level there is this connection and causal connection between MOX and the level of operations at THORP. If they opt to cancel their contracts, reprocessing at THORP would not take place, the discharges at THORP would not take place.

THE PRESIDENT: Could I ask a question? You said that under German law - and we understand that you refer to German law with trepidation - that reprocessing is only permitted if it can be shown that they result in separated plutonium that can be recycled in Germany.

MR BRADY: Yes.

THE PRESIDENT: Does it mean that the recycling is done in Germany or does it mean that it is recycled and brought into Germany?

MR BRADY: I am sorry, I can see the ambiguity, sir, and I am glad that you pointed it out. What I mean is that the plutonium that is brought back is brought back in a form (ie MOX pellets) that are then used for recycling in nuclear power plants. There is not a MOX plant in Germany that can be used to convert the plutonium that is brought back into MOX. I do not know if that clarifies the position.

THE PRESIDENT: Yes.

MR BRADY: I am sorry, sir, now that you have pointed it out to me, I can see its ambiguity. That is the position. Bringing plutonium back by itself to Germany does not solve your problem with German law, because there is not a MOX facility to convert it into MOX fuel so that it can then be recycled in a power station. I hope that that clarifies the position. I am grateful to you, sir, because, when I re-read it, I can see how it gives rise to that impression.

I have approached this on the basis of looking at the connection between MOX and THORP, the physical and economic connection. I have looked at it in terms of the existing contracts and the causal relationship between the presence of MOX and THORP. I here want to look at another level or dimension of connection between these two projects. It is this. Coming back to the essence of our case, it is the fact that MOX has been built that ensures that there will be further an additional reprocessing of THORP and, therefore, additional quantities of activity and additional quantities of discharges. Of course, the simplest and

most obvious case that is demonstrative of that fact is new business. We come back to what I said earlier on. If they get new business, and remember what was said by BNFL, that they see the existence of MOX as being connected to the type of new business they get. They see the joint contract, reprocessing plus MOX activity subsequently as essential parts of the marketing tool of this project. What does that mean? It means that there is going to be more reprocessing through talk because of MOX, the MOX plant being present. Contracts for reprocessing alone which were not allied to contracts for MOX manufacture were a serious problem for this company. And they recognised it themselves and have so said.

I now deal very briefly with new business, that is new contracts, new levels of spent load material being reprocessed and being manufactured. I state in paragraph 3.09 that it is clear from the quotation set out that BNFL entertains the prospect of new contracts for Thorp allied to the subsequent manufacture of MOX fuel. This prospect has been described as being likely, and that is a reference back to one of the remarks made by one of the witnesses during the Ospar case. BNFL is actively seeking these contracts, they are out in the market place looking for them. We contend that such reprocessing contracts will in turn add to the level of activity at Thorp and subsequently at the MOX plant. It is Ireland's contention that there would be no realistic of such new contracts for Thorp unless the MOX plant was available.

I want to deal within final issue under this rubric and it is this. A view appears to be postulated that the BNFL customer own the spent fuel and the separate material and the plutonium and uranium that comes out of Thorp. It is theirs, it is physically theirs. The question arises as to whether they could transfer the plutonium from Sellafield - let us come out of the stream from Thorp - to other MOX manufacturers, and that reduces itself very simply to this. Could they say and are they likely to say we are going to transport our plutonium from Sellafield, we are not going to get it manufactured into MOX in Sellafield, instead we are going over to France in a ship with all this plutonium to Cap de la Hague where we will manufacture the MOX there and then bring it back to Germany or maybe go to Belgium. That if course is another attempted nail in the coffin of our argument in relation to the relationship between MOX and Thorp, but it is not a very secure nail when you look at the reality of what has taken place.

What has been the reaction of the international community to transportation of separated plutonium oxides? This is trouble from start to finish. The United Kingdom has stated clearly of its customers, ie reprocessing customers, that it requires those customers to have an acceptable end use before delivery of plutonium, and here let me make a general comment. There is worldwide concern about the transportation of separated plutonium, because of issues to do with proliferation. I do not want to go into them here, I think we are all acutely aware of where the risk centres are and the problems. But transporting separated plutonium creates problems that exist in the security firmament, and in that context there are concerns and in that context we can see why the British Government has concerns about the end use of any plutonium. We say that there is no practical reality, there is no likelihood of separated plutonium being transported by ship or plane by BNFL to France or Belgium, to be there manufactured into MOX fuel, to go back to the host country,

What is their evidence in this regard? I have already adverted to the intense political objections and concerns about transporting separated plutonium, but let us look at what has actually happened because the best evidence that is available in terms of analysis by reference to the burden of proof and the issue of balance

of probabilities, is what has actually happened in the past because I think we can learn from what has happened in the past as to the likelihood of what will happen in the future, and I am addressing what will happen in the future.

Here we rely upon one shining fact to demonstrate the inherent improbability that there would now be any trans shipment of separate plutonium by BNFL customers to France or Belgium. It is instructive to look at the historical exercise in this regard. The last occasion that separated plutonium was transported or trans shipped was in 1992-94, ten years ago was the last time this happened. I think it is, and I so submit, a reasonable inference for this Tribunal to draw that in the light of that length of time and the absence of another shipment since then, that the high probability, and I do not have to go that far, is that this will not happen.

Even when we look back at what surrounded that former exercise of transporting a separated plutonium from France to Japan in 1993-94, there was a furore, there was a political storm of mammoth proportions. More than 60 states in the world close to which territories and various seas they objected. Stat by state, organisation by organisation. Then you have organisations who are more dynamic in terms of the way in which they mount protests. This was a major crisis, this was politically unacceptable for a variety of reasons. In my respectful submission the inherent probability is ship transhipment to another location for MOX manufacture will not occur.

I will now deal with the factual context, and again as I said at the outset I hope my opening will have crystallised the issues in this relatively complex case, and to put this case into context and in particular the three elements of the gravamen of our case there are some factual matters that can be stated with relative clarity, and about which we do not believe there is any real or serious dispute. Time will tell but as best as we can identify we do believe that a certain factual context that can be the substratum for your assessment of these issues can be set forth. What I am now going to do is to outline that context, that context of fact that is relatively notorious and we hope not seriously or at all in dispute. But it will help to give you the texture to the remaining aspects of our case.

I start off by outlining a series of propositions of fact that we say is an important critical context of this case. There are 14 in all, and I propose to take you through them. I am on page 15 of my opening, and as I have already made clear these are central facts to a context. It is not intended by any means to be exhaustive of all of the facts but merely to be illustrative of some of the essential facts that do not appear to be in significant controversy.

Before I read out the first of those facts may I make it clear that in formulating these 14 propositions we have looked at the evidence of the United Kingdom and we have tried to reflect in these statements of facts the position of the United Kingdom where they may disagree in relation to some details. For instance Ireland has contended that the Irish Sea is the most radioactively polluted sea in the world. The United Kingdom have taken some degree of challenge of that classification, but appear to contend that while it may not be the most radioactively polluted sear in the world it is one of the most. I am happy to rely on that fact. I do not think I need establish that we are the worst, I think it is good enough if I establish that we are one of the worst. What I propose to do is bearing in mind what has been said by the United Kingdom witnesses to

advance these 14 propositions, albeit not exhaustive of the full context.

I believe I am about to trespass into a period of 15 minutes that is reserved for another function.

THE PRESIDENT: it is up to you. If you would like to continue we will have to break at some point, but there is no pressure.

MR BRADY: This is probably as good a point as any as I am starting a new area.

THE PRESIDENT: We will come back in 15 minutes.

(Short adjournment)

MR BRADY: I was just going on to deal with the 14 propositions that we hope will not be the source of any significant controversy during the course of this arbitration. I will refer you to page 15 of the submission. We start off with the fact which we hope is not in dispute.

(1) the Irish Sea is one of the most radioactively polluted seas in the world;

(2) there has been a minimum of 250kg of plutonium discharged from Sellafield into the Irish Sea since operations commenced at Sellafield (formerly Windscale);

That is a fact of some import in terms of the issue of pollution which I will come to address.

(3) there have been discharges of radioactive wastes from Sellafield into the Irish Sea since 1952;

(4) Sellafield is the principal but not the exclusive source of the radionuclides in the Irish Sea, other sources have included continued fallout from nuclear testing, and the effect of the Chernobyl accident in 1986;

(5) plutonium is one of the most radiologically toxic materials known;

(6) the recent publication of the UK Strategy for Radioactive Discharges 2001-2020 contains an expectation that THORP will continue operating until 2024; however, this is so notwithstanding that the existing contracts will utilise capacity for a much shorter period;

(7) BNFL have in the past stated that they expect the MOX plant to have a nominal operating life of 20 years;

(8) discharges into the Irish Sea, from Sellafield, increased from the 1950s to the mid 1970s; however, since the mid 1970s the level of discharge of most (but, as you will shortly see, not all) radionuclides has reduced considerably;

(9) there has been an increase of the level of discharges of technetium-99 and iodine-129. Technetium-99 is discharged predominantly from the Magnox reprocessing plant (B205), a small percentage of it is, in fact, discharged from the THORP plant, approximately of the magnitude of 1 per cent. However, Technetium-99 as so discharged has appeared, for instance, in Norwegian waters and in the Arctic Sea. Iodine-129 is produced and discharged primarily as a result of the operation of THORP. Both technetium-99 and iodine-129 are, therefore, increasing the level of discharges; the preponderance of iodine-129 comes from THORP, the preponderance of technetium-99 comes from Magnox.

(10) the levels of contamination, due to technetium-99, in some shellfish from near Sellafield have, since 1994, been in excess of the Community Food Intervention Levels, otherwise known as CFILs. CFILs were laid down after the Chernobyl accident. The United Kingdom, however, challenges the applicability by EU Directive of CFILs to technetium-99 and the circumstances in which they apply. As I understand it, it is a

regulation that is to apply, according to the UK, in the context of events such as the Chernobyl disaster, but the fact of the matter is that the level of technetium-99 is in excess of the CFILs.

(11) The half life of plutonium-239 is 24,065 years. Other forms of plutonium have a shorter half life. I think that some of them go as low as 40 years. That is in relation to certain isotopes or forms of plutonium.

(12) The half life of technetium-99 is 213,000 years.

(13) The half life of iodine-129 is 15.7 million years.

(14) In general, the radionuclides that give rise to the most significant radiation doses to the public are:

a. Caesium-137

b. Technetium-99

c. Americium-241;

d. Plutonium (in various isotopes)

These doses are delivered primarily through the consumption of fish and shellfish.

Before I start getting into the issues that are at the heart of this arbitration, I believe that it is salutary to set out what is the factual basis for Ireland's concerns in relation to MOX, its effect on the promulgation of activities at MOX and, indeed, in relation to Sellafield. I mention them to set yet another context, which is part of the rationale for Ireland bringing these proceedings and coming before this Tribunal to have its rights and entitlements declared and, likewise, to have the obligations and the duties of the United Kingdom declared by an international tribunal. I think that the context for this case and the reason why there exists such extensive concern among the Irish people and the Irish Government, and that has resulted in the initiation of this litigation, has been set out.

Ireland's concerns in relation to the various activities at Sellafield are predicated on hard fact. The anxieties of the Irish public, in relation to Sellafield, are also recognised by the United Kingdom. There is among the correspondence a letter from a Minister, Helen Liddle, of 30th March 2000, where she, in fact, refers to that fact.

I now intend to look briefly at a number of incidents that constitute the factual base for Ireland's concerns and the reason why we find ourselves embroiled in this litigation with a State with whom we have friendly relations.

Some of these are historical, some of these are more recent; one of them I shall seek to demonstrate emanates from information that we obtained during this hearing, when we discovered a new fact that compounds our concerns.

The first issue that I wish to deal with is the incident in Windscale in 1957. On 10th October 1957, at the UK Atomic Energy's Windscale works, a fire occurred in a reactor. This was designed to produce military plutonium. The accident resulted in the release of a large quantity of radioactivity, mainly nuclides of noble gases and volatile elements, into the atmosphere from the reactor stack, and this happened for a period of approximately 24 hours. In the early 1980s, the National Radiological Protection Board in the United Kingdom carried out a detailed retrospective assessment of the radiological impact of the Windscale

accident. The Board estimated an upper bound of approximately 33 additional fatal cancers amongst the population of the UK and Western Europe as the likely outcome of both direct and indirect exposure to the radioactive plume released during the accident.

I just want you to note at this stage my reference to a radioactive plume, because there is an issue that will surface, which I will deal with at a later stage, about radioactive plume, probably in a section where we are in camera.

As is noted by Peter Mitchell, who contributed to a seminar called "Making Sense of Sellafield" in 2002 organised by the Royal Irish Academy, it created concerns, which I will outline. But let me make this comment. What I am about to quote from was a series of lectures delivered in Dublin by very distinguished and eminent bodies of our Irish Academy. It is the United Kingdom who has put this document in evidence as part of their counter memorial, and I seek to rely upon this part for the purposes of setting out the factual basis for our concerns. Mr Mitchell proceeds to state as follows:

"Clearly, the Windscale accident represented an unwelcome though salutary warning of the very serious consequences that can arise following a major nuclear incident. Unfortunately, little appears to have been learnt as far as emergency planning is concerned judging by the chaos that ensued in official and other circles in the wake of the Chernobyl accident in 1986".

In 2001 all existing attempts to decommission the damaged reaction were abandoned as being unworkable. New procedures for decommissioning have yet to be approved.

The second issue to which I wish to refer as part of the background texture is of more recent origin, and it is this. You will recall that in my opening I referred to the MOX Demonstration Facility. This is the smaller unit that manufactures 8 tonnes or it has the capacity to manufacture 8 tonnes of MOX per annum. That was being used up to 1999. We discovered - publicly discovered and, indeed, BNFL discovered - that for a three-year period employees of BNFL working in the MOX demonstration facility in Sellafield were falsifying data.

The third issue that I wish to bring to your attention - and it is part again of the factual predicate for Ireland's concerns - is the conclusion reached by the Nuclear Installations Inspectorate of the United Kingdom (it is a section or a division of its Health and Safety Executive). They quite rightly and properly investigated the data falsification and their findings are a matter of considerable import and a matter that give rise to considerable concern by everybody.

You will see that the Nuclear Installations Inspectorate, having investigated the matter, prepared a critical report and stated as follows, that the activities in the MOX (that is to say the fabrication of data) demonstration facility could not have occurred "had there been a proper safety culture within this plant". It also found that, as the events had been going on for over three years, the management of the plant must share responsibility. It was this report that resulted in Minister Liddle understanding the anxieties of the Irish public in relation to this matter.

The next issue that I wish to address, again a matter of some considerable concern to Ireland, both for our people and, indeed, for the Irish Sea, is the HAST tanks. You will recall in my earlier description of Sellafield that I explained reprocessing of high-level wastes, and, after various treatment stages, they are

stored in what is called highly-active storage tanks (HAST tanks).

Again, I rely in my opening on a document that the United Kingdom has put in evidence in this arbitration. That is the series of letters by the Royal Irish Academy, addressed by some very eminent individuals in this field. Let us see what the quantum of our knowledge is in relation to that document, put in evidence by the United Kingdom. Again, the Royal Irish Academy lectures contain comments by Professor James Slevin in relation to the HAST tanks. The current volume described is equivalent to the volume of water in a 5-metre swimming pool. He observes that this level "is considered excessive by the UK Nuclear Installations Inspectorate (NII)". The NII set 1575 cubic metres as the upper limit for storage in the HAST tanks and it has instructed Sellafield management to progressively reduce this figure until a storage limit of 200 cubic metres has been reached in 2015. He then observes as follows:

"A serious accident or act of terrorism involving HAST would have very serious consequences for the populations in large areas of these islands and beyond".

During the course, again, of these lectures by the Royal Irish Academy, Mr Richard Garwin (Senior Fellow for Science and Technology -Council on Foreign Relations, New York) has noted that the HAST tanks contain 30 times as much caesium-137 as did the reactor at Chernobyl. In the event of internal sabotage or widespread devastation from impact of a large aircraft at high speed there would be loss of caesium. In this context he notes, Mr Garwin stated, "The consequences would be most severe" with cancer deaths of a very significant magnitude". You can see that from the report yourself.

The next issue that I want to address, and it is the final issue in the series of catalogue of events that justify Ireland's concerns, is what I call operational errors. We all have to live in the real world. Mistakes are made. Operational errors occur. That is life. But let us look at what has now been revealed through a witness statement introduced by the United Kingdom in these proceedings, that is added to our quantum of knowledge as to what is taking place. There is a statement on behalf of a witness, John Simon Clarke, who deals with a complex issue which we will not have to go into of the level of what is called "total beta" discharges out of Sellafield. You have beta and gamma rays from the radiation, but this is a technical area about how you measure total beta discharges. It is a very technical low-level operational activity intended to assist regulators and others by giving them precise knowledge as to the level of activities on site.

What we have discovered in paragraph 37 of Mr Clarke's witness statement is the following. I am now moving on to page 20. In that statement, where he is replying to some comments made by an Irish witness about various levels, he then says as follows:

"After the consultation document was issued BNFL realised that the method of calculation it had used, which was the sum of specific beta radionuclides, was not the Environmental Agency approved method for complex sites such as Sellafield, where the regulatory reporting regime is based on actual measurement, rather than on summation."

To try to put that into ordinary language, they were not doing it right. They were not calculating it right. That is just not good enough for a facility like this.

The result of that was that BNFL has underestimated the "total beta" radioactivity actually discharged. I do not want to be over critical about this particular aspect of the matter, but I just mention it

again as a further illustration of our concerns. You will have to see those in the context of the problems that we have encountered with cooperation from the United Kingdom in relation to this project. I make the point at paragraph 5.02 that, in fairness to the United Kingdom, since these proceedings have commenced, there has been an improvement in the level of cooperation, but there is still the fundamental problem of the failure of the United Kingdom to recognise that Ireland is entitled to information, cooperation and coordination as a matter of right under UNCLOS. I will come back deal with that.

Finally, just in passing I should mention one other point of detail, which I do not think is of great significance, and that is in paragraph 5.04, that the UK Government is proposing to establish a Nuclear Decommissioning Authority which has assumed or will assume certain functions and powers in relation to the nuclear legacy.

I now want to move on to what again is another one of the fundamental features in this case. That is the issue of pollution. I have no doubt you will have seen from the pleadings that many of the grounds of defence advocated by the United Kingdom revolve around two propositions: firstly, whether what is being discharged is pollution, and, secondly, and somewhat related to it, whether there is in truth substantial pollution.

I now propose to address both of those issues in this segment of my opening. I start off with, of course, how one approaches the issue and, indeed, how one identifies the controversy between the United Kingdom and Ireland in this regard. I hope at the risk of being unfair to the very perfectly articulated case on behalf of the United Kingdom that I can perhaps summarise this debate in this controversy in the following way. We go to the top of page 21.

I think that, if we look at this in terms of asking ourselves - and you, sirs, asking yourselves - a number of questions, it helps to elucidate what is the issue and the nature of the controversy. Does the discharge of radioactive material into the Irish Sea over a long period of time constitute pollution? The next question, which encapsulates an alternative view, perhaps, is, is the existence or non-existence of pollution of the marine environment dependent upon conclusive scientific findings of harm or damage to marine biota?

The two questions as posed demonstrate the divergence and approach between Ireland and the United Kingdom to UNCLOS. I said at the beginning, and I will repeat it very briefly, I do not believe that it is necessary or desirable that a Tribunal of this nature should have to resolve issues of scientific controversy and, a fortiori, where one is dealing with areas of science where knowledge is evolving. Therefore, the issue of science joined in the pleadings, the issue of debate, and very distinguished witnesses, is not a matter, I believe, that has to be determined by you. The point that we make in relation to the science aspect is as follows, and this does not appear to be significantly in dispute. The effect of the discharges of radioactive materials on marine life and on the biota, other than man for the moment, is very much in its infancy. The state of knowledge of the scientific community, the state of knowledge of the respectable community looking at these issues, is at an embryonic stage. That is where we are at this stage in human development. It is that very fact of those scientific uncertainties that we say is of considerable import and, in particular, when you come to construe the articles of UNCLOS as part of the factual background that you can rely upon in the interpretative exercise, the existence of uncertainties of the impact on the biota, and particularly other than

man, is a relevant factor. However, I do not postulate our case solely on the basis of uncertainty. The uncertainty is of particular value in terms of interpretation. Ireland goes further. We say that there are adverse effects and consequences emanating from the discharges of radioactive materials into the Irish Sea. At paragraph 6.03 I seek to outline what they are.

While we readily acknowledge that there is a dearth of information on the radiological effects of low doses - that seems to be one of the key points here - on humans, however, we say that there is a body of evidence from the scientific community and, in particular, evidence that is to be found in a witness statement of Dr Carmel Mothersill, which demonstrates that, even at low dose radiation - this is the UK case - there are certain effects that occur to living organisms. These effects are described and they will be explained in greater detail, and hopefully with simplicity that I would aspire to, as follows. They create at low dose, where you have what is called a pulsed or acute exposure - in other words, it is not long-term chronic background exposure - it creates a phenomenon of what is called genomic instability and bystander effect.

Again, at the risk of falling into the trap which I urge you to avoid by getting into the science, I just want briefly to give as best I can a layman's description of these concepts. I am referring to paragraph 6.03. Dr Mothersill will, of course, also address the recent International Commission on Radiological Protection change in position. Even a respectable body relied on so heavily by the United Kingdom is itself now recognises the need to address radiological impact on environmental matters and to do so on its own merits.

Let us just look at what the opinion is that is postulated by Dr Mothersill. I propose to read from that. She says 6.03: "This acute exposure results in mutations in the DNA of a cell that is part of the progeny line of a cell exposed to the radiation doses." I think that my understanding of that is radiation impact, cells reproduce; it is at the subsequent stage, it is further down the line that children or the grandchildren or the great grandchildren, it is there that you get this DNA problem. This occurs even though the grandfather of the cell that has the DNA mutation does not itself have that DNA mutation. The effect of this genomic instability and bystander effect creates a widespread effect. It is not just the target area of the radiation, it is not just those few cells that are attacked by the radiation. It has, so to speak, a systemic effect. It is a bit like a stress response in the organism to the radiation dose, even at low level. It occurs in circumstances where there is an acute exposure to low dose radiation. It again, putting it somewhat colloquially, comes from the hit not from the existence of this background radiation dose. The scientific evidence we contend demonstrates that where there has been an acute exposure of a population of cells, so radiation dose, there is a greater frequency of mutation in the subsequent progeny of the cells than unexposed cells. So the grandchildren get the DNA of those who are hit, the other grandchildren of those who are not hit do not have that problem.

Whether or not these mutations will result in cancer is dependent on the following.

The fact that you can have an exposure and you can have a DNA effect or alteration of the progeny and have no cancer would make one instinctively say, "Well, that is the end of the causal connection between cancer and the low-dose radiation". At first blush that seems like an attractive proposition. But in fact what that misses out is this. Where the cancer has developed as a result of this DNA mutation it is according to our evidence in consequence of a predisposition or a susceptibility to developing the cancer. It is something that

is there that is in it that if it gets hit it gets the DNA, it then has this exposure to the risk of developing the cancer. That is as best I can explain in layman's terms the proposition advanced by Dr Barnaby who will be called to give evidence and who will be taken through her evidence, subject to whatever rulings you may make on other issues, to deal with this issue.

Whether one looks at Dr Barnaby's evidence as perhaps evidence that is developing even though we say knowledge of genomic instability was in the literature going back for decades, we do not really have to go that far for this reason. One of the UK's witnesses has accepted damage to marine organisms. So while we say that there is this problem at low dose radiation and will articulate our view and set forth our position as to why we are concerned about protection and preservation of the marine environment, in one sense it is an interesting debate and a wonderful academic exercise, but just look at what the UK witnesses have said. You will see on page 22 that Ireland contending that the discharges from Sellafield causes damage to marine living species, we note that Dr Dennis Woodhead, although he is concentrating on damage to humans, accepts from what we can see, or appears to accept, damage to living marine organisms. He does express the view in fairness to him that it is not significant. That is to confuse two things. It is the difference between damage and the extent of the damage. We say even on the UK's evidence there is damage to marine organisms.

I have set out in some detail our case in relation to damage because the issue of damage surfaces as to whether the occurrence of damage is an essential ingredient of the definition of pollution to the marine environment. But I would urge on this Tribunal perhaps a more practical and intuitive approach to the question of definition of what is pollution. The practical approach in my view is one which stems from a remark or dicta of a very distinguished English jurist and he was talking in the context of litigation about whether or not there existed a duty of care. Very wisely he articulated a test which I think can be applied mutatis mutandis to the issue of pollution. The English jurist said whether or not a duty of care existed was really a judgment based on an educated reflex to the facts. Let us look at that from that criterion, looking at the facts in relation to pollution.

Let us pose a simple question. Is the long term discharge of radioactive material into the Irish Sea pollution? The instinctive and intuitive answer is Yes, and we contend it is the right answer. Let us look at one fact about the cocktail of radioactive material. Let us take plutonium. It is one of the most radiologically toxic materials known to man. It is going into the Irish Seas. It is going into a motherload of 250 killogrammes of it that has been there for a very long time. It is toxic and the discharges comprising it and other radioactive materials are in our respectful submission pollution.

It is also interesting in this regard looking at the definition of pollution to look at article 194 which imposes a restraint on the discharges or releases of toxic materials. I do not propose to take you to this at this stage, it will be dealt with by another one of my colleagues in the opening. But I think in my respectful submission the common sense and practical answer is this is pollution. You do not need a bevy of scientists to tell you whether it is or is not.

Then let us look at it in terms of its practical consequences. Is it seriously to be contended that long term discharges of radioactive materials into the Irish Sea are not pollution? Let us just probe the consequences of that proposition being sustained. It results in the following. It means that the discharges of

radioactive material are beyond the purview or ambit of UNCLOS. They are not regulated by UNCLOS. They are outside of the scheme of UNCLOS. That may very well be a fundamental issue that this Tribunal have to grapple with. We therefore contend that these discharges are radioactive pollution. They impose a pollution burden on the Irish Sea and the burden consists of a continuing addition of radioactive material with very long half lives to very large quantities of radio nuclides already accumulated in the Irish Sea, and continuing exposure of marine biota to the hazard or occurrence of harm. This is a risk being imposed on the Irish Sea. The discharge creates at a minima the risk of the adverse affect of radiologically toxic plutonium. The principle that the polluter pays may have some relevance here and it arises in this way.

If you formed a view that there may even be some doubt about this being pollution who benefits from that finding? It is the person who is actively engaged in the discharge of radioactive materials, and while it may be an extension and pushing out the boundaries of the principle I think it is important to recognise that those who discharge radioactive materials should not get the benefit of doubt as to whether this is or is not pollution.

I now come to deal with what appears to be a bigger issue and that is the question of whether it is substantial. There are two issues. One is it pollution (a), and (b) is it substantial? Of course UNCLOS is not just about the nuclear industry, it covers every activity on land and elsewhere. If we have to engage with the issue of substantial does that mean do you look at it solely in volumetric terms; is it the total quantity of material discharged and therefore it is pollution and substantial pollution.

In my respectful submission whenever there are other industries where you are dealing with the nuclear industry the issue of substantial pollution has to be viewed through the prism which contains the following views.

(1) Plutonium is one of the most radio toxic materials known to man. (2) Its half life of the isotope 229 is 24,065 years. (3) in the case of MOX and Thorp you also have to take cognisance of the following. The continuous discharges. This is not a one off discharge, it is a continuous discharge to 2020 or 2024.

The next point that is germane is that the radioactive discharges are adding to the bedrock of existing radio nuclides in the Irish Sea, and my friend Mr Fitzsimons who will follow me will give greater detail about that. I think you are also entitled to look at the half life of other radio nuclides like technetium-99 which is 213,000. So 6.08 goes on to repeat that point in terms of substantial pollution. The nature of the material discharged is a relevant factor. The longevity of the radio nuclides, the deposition of some nuclides on the sea bed where they remain for a very long time. The continuous and persistent nature of the discharges over the life time of MOX. Quantities and levels of discharges we do not say are irrelevant, but they are not the determining factor.

I have skipped over one thing, the definition of pollution which you will find in UNCLOS, Article 1(4) and the point which I wish to make and you will have an opportunity to look at that in due course and it will be dealt with by Professor Lowe, but one point I want to make in that without getting into the analysis of its wording is that the definition in article 1(4) of UNCLOS is not an exhaustive definition, it is illustrative. It sets out instances of pollution, and the range of the gamut of those instances is very instructive, because it covers the range of activities from the actual to the potential. It deals with harm and hazard and it is

submitted that it encompasses the activity of the discharge of radioactive materials with all its known and unknown consequences.

I now want to go back to page 24, and I summarise our case there about half way down after I have enumerated the relevant factors for calculating what is substantial, and I say in any event Ireland contends that the addition of radio nuclides and thus the increase in the levels of concentrations of the same to the Irish Sea is pollution. To increase the concentration of levels of radioactive material in the Irish Sea is to adversely affect the quality of the water in the Irish Sea. Manmade radioactive material is being added to the Irish Sea and such material is foreign to that sea and alters the quality of that sea by the addition of radioactive materials contained in the discharged waste. It is thereby pollution. It is just another string to our bow as to what it is that constitutes pollution. You are putting in these concentrations of radio nuclides and in our respectful submission it affects the quality of the water, ergo it amounts to pollution.

There is one issue that surfaces and has surfaced from time to time, and it is this. It is unquestionably the case that Ireland and I believe the United Kingdom discharges radioactive materials in the form of hospital product into the Irish Sea. That may be so but it is not a defence to what has been done at Sellafield.

I now want to deal with what has perhaps been the most skilful and clever case made by the United Kingdom in response to Ireland's case. It is unquestionably a reflection of the ingenuity of the legal team of the United Kingdom that they have focused on this issue and no doubt see it in somewhat loose terminology as a knockout punch for the Irish case. It is radiation dose and low radiation dose. Because of its importance to the English case and the intended affect on our case I just want to spend some little time dealing with it.

Radiation exposure is a fact of life; it is here, it is all over the place. The sources of natural background radiation include cosmic rays from outer space, gama radiation from rocks and soils in the earth's crust and radon gas. Background radiation is a chronic as opposed to an acute source. You will recall the point I was making about genomic instability and the acute exposure even at low dose radiation. It is interesting to look at the very helpful paper produced by the United Kingdom being the UK's strategy for discharges for 2001 to 2020, dealing with this whole question of background radiation. I think it is a useful illustration of where the debate brings us in relation to this matter.

85 per cent of the average amount of radiation to which the UK population is exposed occurs naturally from the sources I have listed. 14 per cent comes from medical exposure. The population as a whole in the United Kingdom has an average annual dosage of 2.6 mSv. I state instantly that that is significantly above the figures that are mentioned in terms of the mSv exposure or microSv exposure from certain discharges from MOX, for instance. But I will come in a moment to demonstrate how that is not really on the point.

In Ireland unfortunately I have to say the background radiation is higher. We are up at 3.62 mSv. I can explain that. It is simply a fact of life that the dosage is higher because of higher levels of radon gas. That is life, that is where we are but at the end of the day it is neither here nor there in my respectful submission. Discharges from nuclear installations contribute less than 0.1 per cent of this UK annual average dosage. So when you look at it you say to yourself in the UK 85 per cent of it is background and

there is nothing you can do about that. 14 per cent is medical and we are not going to close down the hospitals. So really what we should be looking at is the 1 per cent that comes from other sources, including the nuclear industry. Really one should look at these percentage figures with some degree of circumspection. 0.1 per cent we do not challenge, but it is 0.1 per cent in the context of the remaining percentage has been accounted for as matters of fact of life.

Again I just want to put this in practical terms, and it is helpful to put it in practical terms and then move on to where the debate really is. A person on a return flight between London and the Canary Islands will receive about five times the level of exposure from cosmic radiation than a typical member of the public living in the vicinity of a nuclear installation. I imagine it would be the same if you were flying from Dublin to the Canaries, but for the purpose of this exercise we can say that. Moreover the Radiological Protection Institute of Ireland - and this is our body set up by our government established by statute - accepts that there are no significant health affects from consuming sea food taken from the Irish Sea. Of course that is the evidence available from this eminent body, but come back for a moment, this part of UNCLOS is about protection and preservation of the marine environment, and this is where I say with the greatest of respect the United Kingdom has gone wrong, and far from the low dose radiation being the strongest point in their case it is - and I say this with the greatest of respect - the flaw in their whole approach to this issue.

I have taken you briefly through some of the information which I have extracted from the UK strategy document for radio discharges, and at the end of that paragraph on page 25 I pose this question. Have we all to pack up shop and go home because of these facts? is this the end of the debate? Do these facts signal that radioactive discharges into the Irish Sea are not pollution? The UK case is yes we should.

I want to deal with these briefly and pass through these hopefully with some greater speed; the uncertainties that we enter in this area and uncertainties recognised by the UK. UNCLOS is concerned with the preservation and protection of the green environment. Ireland contends that there are many inherent uncertainties in relation to the impact of discharges from Sellafield on the marine environment. These scientific uncertainties exist as a matter of fact and this should inform your approach to how you deal with it.

One point I want to make is this. At paragraph 6.11 of my submission I deal with this issue briefly about scientific uncertainties, and it is very constructive to look at a consultation paper that was prepared in June 2000 by the United Kingdom Government in relation to its policy in relation to the strategy for discharges, and it was prepared in response to the Ospar declaration. Having set for a definition of what is the precautionary principle in terms of the principles and aims it wishes to apply it has a very interesting proposition advanced at the end of that definition. It says that in terms of taking preventative measures that these measures should apply even where there is no conclusive evidence of a causal relationship between the inputs and the effects.

At 6.12 - and I do not wish to delay too long - the issue of uncertainties dealt with again, and again it is dealt with by looking at the UK's evidence, and you see I quote from two passages. The UK Strategy for Radioactive Discharges on page 26, there is an extract set out and you will see there it says that concern has been expressed in some consultation responses that exposures to levels significantly higher than natural background may occur and that risk to wildlife are not explicitly considered in human dose assessment

methodology. That is the problem. The ICRP recommended levels are concerned with exposure of humans, they never address the marine environment. But then they say that at present it is recognised that a radiological protection framework for species other than humans is at a relatively early stage of development internationally. The UK, other countries and international organisations are funding research projects on radiological effects on non human species. Guidelines values have been developed for exposure levels below which affects on populations of various groups of biota are thought unlikely to occur. As part of the Ospar strategy the Ospar Commission is developing environment quality criteria for protection of the marine environment from adverse effects of radioactive substances and has to report on progress by 2003.

Mr Parker, who is a witness on behalf of the UK states in a statement of the 19th April 2003 "A comprehensive assessment of the radiological impact of radioactive discharges from Sellafield on wildlife, including marine biota, was undertaken as part of the recent review of Sellafield's discharge authorisations. Previously it has been considered in accordance with past recommendations from the ICRP that if mankind if adequately protected then so too are populations of other species. The Environmental Agency considers that there is now a growing recognition that the protection of the environment merits attention in its own right and seeks to apply an approach which, in accordance with developing international thinking takes specific account of the environmental matters". He then goes on on the next page to offer some further views which no doubt will be of assistance to the Tribunal, and he states as follows: "The results of all of these assessments indicate that the radiation doses received by marine and terrestrial biota are both now and will continue to be well below the international guideline levels suggested in 1992 by the IAEA. There is therefore no evidence at the present time of significant impact on wildlife. However the agency is well aware of the developing framework for such assessments and the associate work to reduce the residual uncertainties in the existing methodology."

The Marina II study which was commissioned by the European Commission continues with this theme and it has made it clear that radiation doses to marine biota the than humans may be of orders of magnitude different from the exposure of humans. Their living conditions are different. They exist in natural ecosystems. Moreover, there are no internationally agreed criteria or guidance for assessing the impact of environmental radiation on flora and fauna.

Evolving knowledge. Even on the basis of the United Kingdom's evidence there is uncertainty. While current recommended level of radiation dose does not present evidence of a significant impact on wildlife this is an area where knowledge is evolving. Time is an ally of man and the environment. As the quantum of our scientific knowledge grows so also does our ability to protect man and the environment. Setting regulatory thresholds contributes to this process but regulatory thresholds are not a guarantee in perpetuity that there will be no adverse consequences. I think it is important to deal with this because much is made out of the argument by the United Kingdom that the radiation dose to man from its discharges are significantly below the threshold set by the ICRP, and I wish to address this issue quickly in the context of pollution and indeed against the background of scientific uncertainty. There is a point to make and it is a very simple point. It is interesting to observe that the annual maximum permissible radiation dosage to members of the public of 5 mSv was postulated by the ICRP and was reduced by it in 1985 to 1 mSv. I am not

criticising the ICRP, but it just shows the level of precaution and the requirement for precaution. A 500 per cent reduction in the maximum threshold level of exposure to radiation does for humans. However, what is interesting to note is that when the levels of radioactive discharges from Sellafield were at their highest in the late 1970s and early 1980s the radiation dose out of Sellafield was 2-3 mSv. Of course it was below the threshold, but two to three times greater than the current threshold. We all benefit from increased knowledge and greater regulation but the very fact of this significant reduction in the prescribed limits is eloquent testimony of the fact that one is in an area of evolving and developing scientific knowledge and methodology.

How is that relevant to this Tribunal's approach to this case? I submit that the current scientific assessment as to the impact of radioactive nuclides on man as opposed to other biota should not be the determinant of what is or is not pollution of the marine environment or whether or not it is substantial. The absence of conclusive proof of the extent of such damage to the marine biota is not dispositive of this issue. What is to happen if this generation of scientists have got it wrong, what if they have failed because of an absence of an analytical tools to determine hardly known impacts on marine biota of exposure to radiation. Is subsequent development in scientific knowledge that shows harm to the marine environment probative of the existence of pollution at the date the knowledge is acquired, or was it always pollution. If it was pollution at the point in time the knowledge was acquired in our submission it was always pollution. In my respectful submission the fact that the radiation dose is either exceeded or is not exceeded is neither here nor there, it is not the criteria of pollution and it is certainly not the criteria of whether it is substantial pollution. That I say is where the United Kingdom seek to create the fulcrum of the case and it is with respect one that is flawed.

I do not make a case on behalf of Ireland that just because there are scientific uncertainties we should do nothing. This is not a prescription for total inertia. What I do say is that while Ireland is non-nuclear we are not anti development. However, where you are engaged in an industry, the nuclear industry with reprocessing and manufacturing MOX the existence of these scientific uncertainties which exist as an acknowledged fact impose a heavy duty and a heavy burden on both the Operator, BNFL, and the state to ensure compliance with UNCLOS. The uncertainties affect the nature of the standard of the duty that they should aspire and should achieve.

I say that these uncertainties are relevant to the interpretation of the three points that are at the heart of our case. The extent and the date at which an article 206 assessment was to be carried out. The nature and extent of the cooperation and coordination between states and the duty to take measures designed to minimise to its fully extent possible sources of solution.

Let me put it this way. If each state is to share the risks then we should also share the knowledge. This is particularly so where the risk is created by the unilateral action of one state in approving an authorising nuclear industry activities in its own state.

I am going to move on from 7, which is the SINTRA Declaration and I am sure you have all read it and are fully aware of it. I am simply reciting it here. In the interests of speed I now move on to the three elements of course case based on violation of the provisions of UNCLOS. I am moving on to page 30 and dealing with cooperation and coordination.

Let me make a number of very simple points here. I outline what the basis of that claim is in

paragraph 8.01 but just dealing with the issue here, we are not concerned with forms or procedures for giving information. The United Kingdom's evidence is full of one body after another where information can and is exchanged from time to time. That is not to solve the problem. They may have an abundance of forms and mechanisms for communicating information but where the problem has arisen is either they have not given us the information or if they have given it to us they have made it crystal clear that it is given on a confidential basis and we have no right to it. We need to clarify that.

It is not that the United Kingdom has not given us information; it has given us information; it has cooperated with us from time to time. But our case has two elements. One, there are occasions it has refused the information; and secondly when it has given us the information it has not said or acknowledged we are entitled to it and they have given it to us on a grace and favour basis.

In 8.02 I proceed to reemphasise the point I have just outlined and we say that the origin of the problem in Ireland's view is a failure on the part of the United Kingdom to recognise Ireland has rights to cooperation and coordination of state activities. I mention that for this reason. This particular part of the case has a particular utility and it is this. This Tribunal has been asked to make orders. One of the orders we are looking for is a declaratory order. When you come to address the relief and you look at whether or not a declaratory order should be made, the utility, the value and the purpose of that order, is a relevant consideration. By prescribing what is the extent of the UK's duties, you contribute to resolving this dispute by setting out what are their duties.

I then move on to give three illustrations of the nature of the duty. It is at the top of page 31. We say that the duty of cooperation is essentially transmuted into three sub-obligations which are as follows:

(I) the duty to inform

(2) the duty to consult

(3) the duty to coordinate.

We seek that information as a matter of right. I readily accept that there are certain types of information in the security averment to which we are not entitled. As a sovereign government, the United Kingdom has certain types of security information that they are entitled to keep and respect, but there are some problems with that which I will deal with.

The next couple of pages for reasons that I have already outlined I will come back to at a later stage. I now ask you to go to page 33 and deal with one species of our difficulties which is the refusal of information. I think that I can deal with this quite briefly. We looked for information. We brought the case before OSPAR. The decision is imminent. We will accept whatever that judgment is. I do not think that this Tribunal has got to go into it. I think that, while there is a lot of to-ing and fro-ing in the pleadings about the OSPAR matter, that has been heard before OSPAR and, as far as I am concerned, OSPAR's decision will determine that issue, so I intend to move on from that.

The other issue is this. Professor Vaughan Lowe will deal in greater lengths with the issue of cooperation.

I said right at the outset that this case did not come out of the blue. We had been chasing information and looking for information and looking for greater performance of obligation by the United Kingdom for

eight years. I just want to give you a brief flavour of where we are at in relation to it and where we were and why we have ended up before this Tribunal. We wrote a letter on 23rd December 1999 - and it is one of many, many letters which are in the voluminous documents that have been given to you - and we sought information from the United Kingdom, and I want to deal with it fairly quickly. In the context of the falsification of data, we wanted to know certain information. We wanted to know what was the position about the Japanese Government and its contract. We wrote on 23rd December, looking for a response in relation to that and looking for confirmation that no decision will be taken on economic justification until the Japanese clarified their position. And we looked for process of consultation which would be extended to permit consideration of the economic viability of the proposed MOX plant in the absence of any Japanese contracts.

The Japanese, if I can put it this way, were not terribly excited about the data falsification incident. There was a serious question mark about whether they would proceed with other contracts. It had a knock-on consequence about the economic viability of the project. We were just asking these questions because we wanted to know if the justification process for MOX was ongoing.

The second issue that we wanted to address was the Environmental Impact Statement. This keeps coming up time and time again in this case. Back in 1994 we were complaining about the contents of the Environmental Statement. It was inadequate. It omitted a whole load of effects. We made our case then and now we are coming back here. We made it I think previously in July - here we are again on the Environmental Impact Statement or Environmental Statement - before they authorised MOX to go ahead. We are writing this letter of 29th March and we say that the Environmental Statement for the proposed MOX plant, which was produced in 1993, did not provide sufficient adequate information to enable the impact of the MOX plant to be assessed. It was noted that more than six years had passed since the EIS was prepared. Accordingly, Ireland contended that further developments in international law required an environmental assessment prior to the decision to authorise, and that was required under Article 206 of UNCLOS. Here we are in 1999 telling them what to look at - go and look at Article 206. The Environmental Statement you produced is just not good enough. We required them to carry out a new Environmental Impact assessment and to take changes into account that had occurred as a result of the UNCLOS Convention.

The third thing that we looked for - this again is another issue that arises in this case - is the question of the technology of abatement that was to be used on site. We raised this issue that there was a contention that the "best available technology" and "best environmental practice" and "not best practicable means" was to be used and not that that was being stipulated by the Environment Agency. We sought the views of the United Kingdom government on those issues.

Those are not, in my respectful submission, unreasonable requests and I do not intend to delay this opening, which has probably gone on long enough, going through all this correspondence. There is a whole raft of correspondence where we are looking for things, looking for information, looking for views. This is a very serious letter.

Let us look at the response that we got. the response is a letter of 9th March 2000. It did not address Ireland's points in detail, because the Minister for the Environment (U) stated that he was in the process of coming to a final decision on the full operation of the MOX plant. It, therefore, took a view, even on the

basis that it was exercising same form of quasi-judicial power, that it could not deal with our issues. It went ahead and authorised MOX without dealing with these issues.

I now want to move on. The next issue I will be going back to for reasons that I have already explained. I want to go to page 36, MOX Demonstration Facility.

Our point here is a simple one. Its simplicity could perceive its significance in one sense and it is this. We are worried and more concerned about MOX than we are concerned about its impact on THORP and we are looking at two particular projects on site in Sellafield. We know that back in 1999 they stopped using the MOX Demonstration Facility. It was a small plant that had a capacity for 8 tonnes of MOX per annum. In 1999 it stopped operating. It would be wrong for me to say that they shut up shop, but it was not functioning. That is wonderful, but what do we then discover? I suppose it was good luck. One of our officials was reading the Official Journal of the European Communities and what did we find in it? We find that the British Government has made an application under Article 37 and made a submission in relation to future operations at the MOX Demonstration Facility. They are cracking it up again. They never told us about that. We found it out by chance. Then we go on and make it clear that what has happened in relation to our dealings about that. I have set that out at page 36, that it was on 26th November 2002 we found out for the first time that the UK intended to restart the MOX Demonstration Facility. We got no advance notice. We got no copy of the UK submission of data. You have to send in general data when you are looking for an Article 27 approval under EURATOM. This had been submitted as far back as 8th May 2002 and there had been meeting of the Bilateral Contact Group. The contact groups for officials meet where information is disclosed on a voluntary basis. They say that they are cooperating with us, but it is very much subject to the qualification that we are not going to give this out as of right. We wrote to the UK on 17th January requesting further information on their plans for the facility and copies of the data as submitted to the Commission. We got a response on 19th February enclosing the general data. This is the document that they sent to the Commission, which confirmed that the MOX Demonstration Facility was expected to operate as a support facility for the Sellafield MOX plant for up to three years. On 20th March, there was another meeting of the Bilateral Contact Group. The UK representatives - it is fair to say officials - in attendance at that meeting were unable to confirm the use as to which the MOX Demonstration Facility would be put and could only go so far as agreeing to explore whether they could provide Ireland with a paper explaining the intended use of the MOX Demonstration Facility. To date Ireland has not received such a paper, nor has it received confirmation that the UK has even agreed to give us this information.

If you look at each one of those on its own, some are of significance, some are of less significance. But, when you look at them in their totality, and I am only giving an illustration, Professor Vaughan Lowe will deal with this in more exhaustive detail in due course, it shows a pattern of conduct which, with respect, is demonstrative of an attitude of the United Kingdom which stems from their failure to recognise the nature and the extent of their obligations under UNCLOS and the nature and extent of our rights. That is where I started off this opening and that is where I am finishing this part of this opening, because that is at the heart of this problem.

I want to deal with two issues, environmental assessment and prevention of pollution.

The environmental assessment argument has become somewhat confounded by references to EU Directives and the production of Environmental Statements. The Environmental Directive passed by the European Union relates to the production of Environmental Statements or Environmental Impact Statements, as I think they are called in some jurisdictions. They are produced as part and parcel of a planning consent process. It is easy looking at the proceeding to confuse the two concepts. The European Union Environmental Statement is a procedure relating to knowledge being furnished to the decision maker. Its jurisdiction is spent when the permission is granted. It grants that permission on the basis of assessing the Environmental Statement and making its judgment. What we are concerned about here is not that EU Directive, that is not part of our case. Our case is a very simple one. It is based on the existence of a separate obligation arising by virtue of UNCLOS. It is to that I now propose to address myself. The basis of this case is to be found in Article 206 of UNCLOS. I just propose briefly, as I am close to the end, to read that to you.

"When States have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant and harmful changes to the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and shall communicate reports of the results of such assessments in the manner provided in Article 205". The emphasis is obviously mine.

A number of issues have arisen here, canvassed by the United Kingdom in its pleadings, and I will deal with them briefly.

Firstly, the question is was the MOX plant facility a planned activity? As you know, sirs, UNCLOS was adopted by the United Kingdom at some date in 1997. The planning permission for the MOX facility had been obtained somewhere in 1993-94. There is some doubt about when construction work was completed, maybe it was 1996. An issue arises as to whether because (a) planning permission had been obtained and (b) construction had been completed - and let us assume for the purposes of argument that it was completed before the operative date in 1997 - does that thereby mean that the MOX plant is no longer a planned activity, therefore, Article 206 is not triggered because it is not a planned activity at the date of its adoption or the date that it becomes binding on the United Kingdom? In my respectful submission, that is a misconstruction of what is intended by Article 206 and I proceed to outline my reasons in that regard at paragraph 9.02. To some extent, this reduces itself to common sense. We say that an activity continues to be planned, in nature, until its actual occurrence. In this case the planned activity was the operation of the MOX plant at Sellafield. That was the project that was planned, ie the manufacture of MOX fuel. However, BNFL was required to comply with certain procedures prior to implementing its plan of manufacturing MOX fuel. Aside from the requirements to obtain planning consent (from Copeland Borough Council) it was also obliged to obtain the statutory authorisations. The UK authorities were compelled, in that context, to make an assessment as to whether the practice - in respect of MOX manufacture - was justified. They did not have the consents, they could not operate, they could not construct anything in this plant until that and the authorisations had been obtained. It is clear that in 1997 BNFL had not yet obtained regulatory approval for authorisation for the operation of the MOX plant. The justification decision was made on 3 October 2001 and commissioning of plutonium was authorised on 19th December 2001. It is submitted that the manufacture

of MOX fuel, ie the activity, continued to be a planned activity at the date, in 1997, when UNCLOS entered into force for the United Kingdom.

I emphasise that again by looking yet again in the context of the textual work of Article 206. Here is it interesting to note that the word used is, in fact, "activities". It is our contention that the word "activities" contemplates a physical activity. Article 206 is concerned with the "potential effect of such activities". Obtaining a planning permission and designing and constructing the MOX plant was not participation in the activity its design was intended to achieve - the manufacture of MOX in other words.

One must carry out an assessment of activities that will, in fact, occur and do so prior to the final regulatory authorisation/decision that is required to enable the activity to occur or - and this is a second string to our bow - before the activities commence if new knowledge or events occur prior to operation commencing. A State should not profit from its delay by being able to ignore material considerations existing at the commencement of activities. In this case part of the delay was attributed to error within BNFL, in the sense of the data falsification episode, and the further submission of additional documentation by BNFL as part of the economic justification case. Delay in authorisation, delay in commencement of operation should not profit persons. There should be no right by virtue of that delay to ignore new developments or new scientific knowledge.

I now want to address what is probably another critical aspect of this case, and that is the time for assessment.

In my submission, the time for assessment under Article 206 cannot be spent when a planning permission is obtained. The wording of Article 206 does not permit of such an interpretation. It is also important to look at what the touchstone of the obligation or the extent of the obligation to be performed. It is knowledge of effects or potential effects of the activity. But when you look at it particularly in the context of evolving scientific knowledge relating to impact on marine biota, one can readily see, in my respectful submission, that the duty to assess is a duty based on current knowledge about actual and potential effects and one that bears account of scientific uncertainties. Is it to be asserted that the duty to assess an impact on the marine environment is spent once planning permission is obtained? We respectfully say that that cannot be a correct interpretation. The duty under Article 206 is to make a current assessment. It is not to rely on an old assessment. The United Kingdom in part relied upon the Environmental Statement, going back to 1993. One may not shut one's eyes to new knowledge and developments relating to the environment. Obtaining planning permission is not an activity in the sense that that word is used in Article 206. It is a step of a regulatory nature, preparatory to the activity occurring. While the obtaining of a planning permission may be the end of the role of an EIS under EU Directives - transposed into Member States laws - it does not abrogate or otherwise discharge the duty to assess under Article 206. It is a continuing duty that applies either up to the final authorisation or, if there is a subsequent delay, of the development of a material nature in relation to scientific knowledge about the impacts, then you must do the assessments at that point in time. The UK position also does not stand up, with the greatest respect, to further assessment in the context of the textual provisions of Article 206. I mention briefly some of these words, but my colleagues will go into greater detail on this. There are a number of interpretative points which I think support the general thrust of my

submission.

Article 206 used the phrase "may cause" and not "will cause". When it comes to assessment, it talks about "potential effects". We say, and so contend, that the combined effect of these two phrases mandates a generous and broad interpretation.

I will now look briefly at what is the function and purpose of Article 206. Let me start off by saying that the United Kingdom cannot have its cake and eat it. The United Kingdom never intended to comply with Article 206. It never said, "We are going down the road of Article 206" and it did not say that for one very good reason. It did not think, and it took the view that it did not apply. It took the view that it did not apply because we say, again with the greatest respect, that it erred in its interpretation of Article 206 and, therefore, failed to apply it. So it cannot blow hot and blow cold. It cannot come around and say that, in substance, we have complied with it. The reason why that contention does not withstand analysis is this. What is Article 206 about? It is about assessing potential effects. What do you do with that? You produce a report. What do you then do with the report? You give it to other bodies. What do the other bodies do with the report? They make it available to other States.

When this is to be done, the assessment and the report the result of that assessment is to be carried out prior to the activity. If you look at Articles 206, 205 and 204, and you take a purposive interpretation of that article, in my respectful submission, there is very clear reason why we had this regimen in those sections, and it is this. It is to enable other States, other responsible States, to resume to be responsible. It enables those States to get the benefit of the knowledge of the report, so that it can take whatever steps it considers appropriate to protect the marine environment. Remember the marine environment is an asset of the world. It is not an asset of the State that is operating the activity. Other States have to be apprised of the consequences to enable them to make representations, whether by engaging and making representations through regulatory processes in the State that is authorising the activity, or at a political level. It is there to educate, it is there to enable representations to be made by States who have an interest in the protection and preservation of the marine environment from its potential effects.

We also say, sirs, coming to the end of page 39, that the word "potential" connotes all of the consequences of the activities, including their risks and results. This presupposes an assessment before the activities occur, and you will see, sirs, references by my colleagues at a later stage to the Virginia Commentary in relation to this.

I now want to move on at paragraph 9.08 to deal with another of the myriad of points made by the United Kingdom to defeat Ireland's case under Article 206. This point again has a superficial attractiveness about it. I say that with respect to the legal team of the UK. It basically boils down to this. We assess impacts by reference to contracts and before they can start reprocessing or manufacturing MOX again, because they have a new contract, they have to go back to the Minister of the relevant regulatory agency and get an authorisation.

In other words, their case is this. We level a level of activity based on contractual levels of performance. What they do not do is carry out an assessment of the potential effects of the project by reference to its design capacity. What they say is that, if we have contracts that account for 20 tonnes or 50

tonnes per annum, we assess the potential effects by reference to that number of contracts as authorised by the relevant agency. I have two problems with that and they are as follows. Firstly, when you actually think about it and stand back what they are saying to this Tribunal is that the extent of the assessment to be carried out from time to time is dependent upon the commercial efficiency of the operator. If they are good and they get 100 contracts, then we assess it at the level of 100 contracts. If they are not too good and they only get 20 contracts, the same project only has to be assessed for 20 projects. Then they will come back next year when they get another contract.

In my respectful submission, Article 206 and the obligation that is case upon the State cannot be one defined by the vicissitudes of commercial activity. The inefficient operator and the efficient operator have the same job. They have to tell, the regulator has to tell, the State has to tell other States the full effects of all of the potential effects of operating the project.

Trying to put that in kind of practical terms as best I can is to have recourse to an analogy and it is this. If one is not impressed with this notion of vicissitudes of commerce delineating the nature of the obligation, or one perhaps thinks that that is the way to go, just look at this in practical terms. If you go back to the Article 205 report, and its function is to educate other States, to enable them to do something, to object or to make known their reservations, what is the effect of this piecemeal interpretation advocated by the United Kingdom? With respect, it is a bit like saying that you have only got to see the final picture when we give you the last few pieces of the jigsaw, but until then you do not know what the picture looks like. It is only as we go through bit by bit, piece by piece, contract by contract, that you then ultimately get assessments accumulatively year after year that show you the full effects, potential effects, of the project. In my respectful submission, other States are entitled to know what the full picture looks like, not to see a bit here and a bit there of the jigsaw, and then at the end realise what the picture actually is. In my respectful submission, the interpretation advanced so carefully by the United Kingdom does not actually stand up to analysis and is not really compatible with the main purpose and effect of the rationale behind Article 206.

I then move on, sirs, to the final sections.

THE PRESIDENT: I am sorry to interrupt you, but we are about a minute on to one o'clock. What do you intend to do?

MR BRADY: I will resume at two o'clock. I will be no more than 10 to 15 minutes, but I think that we will leave it until two o'clock.

THE PRESIDENT: We will adjourned.

**(LUNCHEON ADJOURNMENT)**

MR BRADY: If I could take you to page 41 of my submission and continue to develop the final point that I wish to advance in relation to the issue concerning an assessment under Article 206. Of course one of the provisions that is required to trigger that article is a view being formed by the State in relation to there being reasonable grounds for concluding that that article is triggered. We have two point to make in relation to that.

Firstly let me say that at a later stage in our opening one of my colleagues will outline the factors that we say ought to have been taken into account in terms of the assessment of the potential effects. That is not something that I am dealing with at this stage. I leave that to another one of my colleagues. But just to

address the requirement of the threshold triggering of jurisdiction, that is to say a reasonable conclusion by a member of state in relation to article 206 applying, really the answer to that is as follows. Merely because the United Kingdom concluded that article 206 did not apply is not dispositive of the issue as to whether it does as a matter of law apply. We say they have misdirected themselves as a matter of law in its correct interpretation, and indeed we also maintain that was a failure to fully appreciate the full extent and implications of the Thorp link to MOX.

Besides from that I also say that in the context of this Convention and the arbitral jurisdiction conferred upon this Annex 7 Tribunal that the threshold requirement in relation to the view formed by any state's government is an objective one. There is no right to make an assessment that is superficial. To make sense of the provisions it is an assessment by a British Government or any other government that is capable of being looked at by this Tribunal and this Tribunal's jurisdiction to conclude that the United Kingdom erred in its failure to appreciate the application of article 206.

I make that point at section 9.11 of the submission where I say that the United Kingdom failed to interpret and apply article 206 properly and that having done so it can then not turn round and say it had reasonable grounds for assuming it did not apply. As I say the test is objective.

Perhaps to put it in a more blunt way, and a less diplomatic way, the United Kingdom or any other state, and this would apply to Ireland if it was relevant; the United Kingdom in this instance does not have the right to get it wrong in relation to the application of article 206, and I say that with all due respect and deference to the United Kingdom. That point is made at paragraph 9.11.

I will now move on to the final phase of the segment of the opening of the case that has been assigned to me other than the bits I will deal with In Camera. This is dealing with the issue of the prevention reduction and control of pollution. This revolves round the meaning effect and implications of part 12 of UNCLOS and it provides the legal basis and that will be amplified by my colleagues at a later stage.

I think it is probably helpful at this stage to outline the two features of Ireland's case. They are as follows.

Firstly the failure to address all of the environmental consequences arising from the authorization of the MOX plant; and secondly they misdirected themselves as to the correct standard to be applied to achieve the objectives of UNCLOS. There are many, many sub-issues that arise in relation to this aspect of our case, and they will be dealt with by my colleagues, but what I propose to do is simply choose one issue that is illustrative of our case, and I will now deal with that at paragraph 10.02.

Article 194.2 of UNCLOS involves the taking of measures to ensure that activities are conducted so as not to cause damage by pollution to other states and their environment. Furthermore it is provided that pollution arising from incidents or activities under state jurisdiction or control does not spread beyond the areas where they exercise sovereign rights in accordance with this convention.

Article 194.3 sets out what is the prescribed objective measures to be taken under article 194. It is to deal with all sources of pollution of the marine environment. There is then a list of measures prescribed and it is not exhaustive. The United Kingdom is obliged to take measures designed to minimise to the fullest extent possible (a) the release of toxic harmful or noxious substances, especially those which are persisting

from the land base sources from or through the atmosphere or by dumping. The test that is posited by that article is quite a high test, and the high test is to take steps that are designed to minimise to the fullest extent possible, and one can see why that is so when you see the object at which it is directed, which is the release of toxic harmful or noxious substances especially those which are persistent from land based sources from or through the atmosphere or by dumping. Toxic and persistent are two very important words in the context of this case, particularly by reference to the radionuclides and secondly the inherent operations of the MOX and Thorp plant where there is persistent and continuous discharges. This section we contend is thereby triggered and that in turn imposes an obligation on the United Kingdom to ensure that it has taken steps that are designed to minimise to the fullest extent possible.

The duty that is imposed by article 194.3(a) is very clear in its terminology. We contend it is a continuing duty. It is a duty that entails elements of constant review, of methods and technologies. Toxic, harmful or noxious substances are not to be released where their release can be minimised to the fullest extent possible.

We therefore respectfully submit that radioactive materials contained in the discharges from Sellafield are within the category of sources of discharges identified in article 194.3(a) and then I note again plutonium as one of the most radioactive toxic materials known.

It is interesting to note when you look at the circumstances in which the duty to take measures that are designed to minimise to the fullest extent possible operates. It operates where there are discharges of toxic materials, but when you then go and look at the other illustrations where this high standard is imposed, it is very interesting to note what they have in common. It relates to essentially accidents or fortuities relating to offshore installations; events that are non-intentional; events that are in the realm of speculative and fortuity. They use the word pollution introducing each one of those arising from such fortuity. This section that I am referring to, subsection (a) on page 42, does not actually use the word pollution because it is so self-evident that anything that is toxic is by definition pollution. In my respectful submission that is just another factor that you can take account of in terms of the significance of the application of this test to the nuclear industry.

I am moving on to paragraph 10.04, and I just want to briefly outline Ireland's case predicated on this high obligation of designing measures to reduce to the fullest extent possible these discharges. Our case is that the United Kingdom applied the wrong criterion. They applied the criterion of best practical means. That is not in our submission the same as the criterion mandated by article 194 being technology and design to minimise to the fullest extent possible these discharges. So we say yet again as a matter of law the United Kingdom misdirected itself and misapplied the test that should have been applied to Sellafield during the course of the authorization of the MOX plant.

I just want to give one illustration to put this in practical context and it is this. We know that there are discharges from MOX. We know that they are of themselves small. We contend allied with Thorp they are larger. But in terms of similar industry and a similar facility - and I do not say identical, I do not have to go that far - let us look at what is the position and let us contrast it very briefly with what happened in relation to MOX. It is this. The MOX fuel fabrication facility for the Savannah River in South Caroline features in

this case on two levels. One in relation to the breadth and extent of its environmental statement, but (2) in this context. It is designed - it is not up and running at the moment, but it is designed in such a way that there will be no discharges of radioactive material into the Savannah River. If they can do that then the issue arises as to why the United Kingdom's approach to the application of article 194 did not likewise ensure that there was sufficient design so as to preclude the discharge of radioactive materials into the Irish Sea. This will be dealt with in greater detail with my colleagues.

BNFL is of course a company purportedly run for profit. Designing to reduce discharges to the minimum extent possible does not really give you a licence to decide that increased profit should in any way drive the type of technology. What we do say is that they applied the wrong standard and that is as a matter of law.

Where does this leave Ireland and where does it leave the interests of the international community in relation to the Irish Sea as a resource available to all states and all peoples. I say by way of final comment in this regard at paragraph 10.07 that we have been put in a situation as has the whole world of additional risk burdens being imposed on us by virtue of the way in which the United Kingdom has approached the question of the prevention and control of pollution. In the light of the discharges from MOX and Thorp, the continuous nature of the discharges and the longevity of the half lives of radionuclides a heavy onus is placed on the United Kingdom. As the affects on the biota, through low dose radiation, were now a matter of common knowledge the United Kingdom should not have acted precipitously. It should have either awaited the conclusions of review of the scientific knowledge about impact, such as through genomic instability and bystander effect, or ensured that it had the necessary abatement technology to avoid additional discharges arising from the justification authorization of the MOX plant. Instead the United Kingdom, proceeded to justify and authorise these additional discharges. It simply took a risk it ought not to have courted or imposed on the Irish Sea. This issue will be elaborated on at a later stage in the opening.

My final concluding remarks in this regard sums up to some extent the position where we are at present, and it is this. In permitting the MOX plant to proceed the authorities have taken a leap in the dark. They have required Ireland to take a leap of faith in their decisions. Ireland is not obliged by UNCLOS to take that leap of faith.

I now propose to address in camera the remaining issues which I passed over and I will do so quite briefly. Mr President if you wish to make an order in relation to this.

THE PRESIDENT: Thank you very much. I request all persons other than the parties and counsel to the parties to leave the room now.

(**See separate transcript for hearing in camera**)

THE PRESIDENT: Mr Fitzsimons.

MR FITZSIMONS: Thank you, Mr President. Mr President, I think that you have been furnished with a copy of the submission that I propose to make. Copies are also, of course, being made available for our colleagues on the other side, together with a Judge's folder, and I will be referring you to some short extracts from documents that are contained in that folder.

It is my task to outline to the Tribunal the factual background to this claim and to draw the

Tribunal's attention to aspects of the evidence relating to the submissions that will follow. The Attorney General in his opening address has already covered some of the important factual issues. I will, therefore, seek to avoid going over old ground. If there is some minor degree of repetition in the interest of continuity, I hope that the Tribunal will bear with me.

Firstly, MOX fuel, the MOX plant and the MOX Process.

The MOX plant at issue in the present case is not the first MOX plant to be built and operated in Sellafield. In 1993 BNFL commenced the operation of a pilot or demonstration plant known as the MOX Demonstration Facility (MDF). This plant had a nominal production capacity of up to 8 tonnes of MOX fuel per year for use in Light Water Reactors. The use of the MDF Plant is now confined to research and development activities in support of the MOX plant.

The history of the MOX plant commenced with the submission of a planning application to the relevant UK planning authority on 2nd October 1992. Planning permission was granted for the construction of the plant on 23rd February 1994. Construction commenced in April 1994 and this phase appears to have been completed in or about 1996. The Plant then had to be fitted out and equipped. The BNFL Annual Report of 1998 states that at that time the MOX plant was nearing completion. As permission to discharge radioactive wastes was required by law, and had not been given, a regulatory procedure was engaged in from 1996 onwards.

The final decision makers in this process were the UK Secretary of State for the Environment, Transport and the Regions and the Secretary for Health. On 3rd October 2001 the Ministers announced their decision that MOX production at the MOX plant could proceed. Ireland had over the years continuously and consistently opposed the MOX plant proposal and I will give details of this later.

The MOX plant is a commercial MOX production plant with a capacity of 120 tonnes per year. It is designed to manufacture fuel for Light Water Reactors, both Pressurised Water Reactors and Boiling Water Reactors. There are two separate production lines in the MOX plant. Each one consists of a mill, a blender, a second mill, a spheroidiser, a press hopper and a pellet press. The primary components of MOX fuel are uranium and plutonium - more accurately, uranium oxide and plutonium oxide. Thus the name MOX -mixed oxide. To manufacture MOX, the uranium and plutonium are thoroughly mixed to produce a homogenised powder. There follows a blending and milling process with the addition of a dry lubricant and conditioner which produces a granulated powder. the granulated powder is then milled, pressed and sintered in a high temperature furnace. The result is MOX in the form of cylindrical crystalline pellets. The pellets at the end of the process are in ceramic form. The pellets are small - about the size of an ordinary pill or tablet in capsule form. A pellet of this size contains enough plutonium to kill 5,000 people. Of course, one millionth of a gram of plutonium can cause cancer in a human. The pellets are produced to the specifications of the customer.

After pellet production the pellets are then inserted in MOX fuel rods. These rods are zirconium alloy sheaths. A typical fuel rod contains abort 300 MOX pellets. The fuel rods are then in turn assembled in to a square type array suitable for placing in the customer's reactor.

Waste and Discharges from the MOX plant

All nuclear manufacturing activities give rise to waste and discharges. It is possible to manage and store waste and to prevent discharges absolutely. At Sellafield, whilst there are extensive waste management policies in operation, there is and always has been a policy of discharging nuclear waste directly into the Irish Sea. In basic terms BNFL have a large pipe that extends into the Irish Sea from its Sellafield facility. BNFL pipes liquids containing nuclear waste through this pipe into the Irish Sea. This does not happen accidentally. It is quite deliberate and it part of the BNFL policy of managing nuclear waste at the Swiss franc plant. It may seem surprising to the Tribunal that I can make such a statement. However, it is a fact and it is not at issue in this arbitration.

The UK seeks to explain the BNFL policy of deliberately discharging liquid nuclear waste from the Sellafield facility into the Irish Sea by saying that the amount of the liquid discharges fall within the authorised limits for nuclear waste discharges set by the UK Environment Agency. It is not, therefore, just BNFL that is involved in the policy of discharge of nuclear waste into the Irish Sea.

As a starting point for the consideration of all issues in this arbitration, this Tribunal can proceed on the basis that it is not at issue that the UK, through BNFL, openly and unashamedly discharges liquid nuclear waste into the Irish Sea from the pipe leading from the Sellafield facility. Further, as is apparent from the evidence, it intends to continue with these discharges. Indeed, as acknowledged by the UK, within the next few years these discharges will increase.

The UK says that the amount of liquid radioactive discharges from the Sellafield site falls within the UK discharge authorisation. They accept that there will be liquid radioactive discharges from the MOX plant and that these are to be included in the total of Sellafield discharges from time of commencement of operations. Indeed, in 1993, when the MOX plant was being planned, the Environmental Statement prepared in connection with it expressly states that there would be liquid radioactive waste from the plant that would be discharged directly to the sea. However, they assert that “it is estimated" that the MOX plant discharges will form but a small fraction of the overall Sellafield discharges. The estimate relied upon is a UK Environment Agency document of October 1998. Unfortunately, because the MOX plant has only recently commenced operations and presumably is not yet up to full capacity, we do not have reliable, or indeed any, figures to confirm the estimates made.

Apart from liquid radioactive waste discharges from the MOX plant, it is also accepted by the UK Government that there are, in addition, aerial discharges. It is Ireland's case that, because of the proximity of the Sellafield side to the sea, that a proportion of these discharges end up in the Irish Sea, Again, the UK seeks to explain away these discharges by contending that they are small. Reliance is placed upon a UK Environment Agency 1998 document which expressed the view that total radioactive discharges to the air from the MOX plant would contribute less than 1 per cent to the total discharges to the air from the Sellafield plant.

In essence, therefore, the UK is saying to this Tribunal that since the amount of liquid radioactive waste being discharged into the Irish Sea is very small, this Tribunal should excuse it and find that the UK is not in breach of its UNCLOS obligations. The UK goes this far: it says that the MOX discharges are so low that they are not even subject to UNCLOS. Put another way, the UK is requesting this Tribunal to hold that

UNCLOS permits Stats parties to it to have pipes leading to the sea from their territory through which liquid radioactive waste can be discharged.

In considering the UK case on this issue, there is another factor relevant to the dispute that the Tribunal should take into account. The Irish Sea has been described as "the most radioactive sea in the world". This was a conclusion arrived at in 1985 by the UK Environment Committee of the House of Commons. That Committee found that as a result of the "discharge of huge volumes of low level waste from the Sellafield pipeline" at least a quarter of a tonne of plutonium had been deposited in the Irish Sea. The plutonium and americium levels were found to be at least 15 times the North Atlantic fallout levels. the UK House of Commons Committee was of course considering the situation after 30 years of discharges since the commencement of operations at Sellafield. Similar findings were made more recently in the OSPAR Quality Status Report for 2000 which stated that there was an estimated 200 kgs of plutonium in the Irish Sea. The UK witness, Dr G J Hunt accepts this figure. The plutonium in question has a half life of 24,435 years. Dr Hunt takes issue with the House of Commons description of the Irish Sea as the most radioactive sea in the world. However, he is prepared to say that the levels of artificial radionuclides, both in the sea water and in seabed sediments, "may rank among the highest in the world."

I refer the Tribunal to these findings for this reason. Ireland accepts that the discharges from the MOX plant are likely to be small without taking into account discharges from THORP. Ireland, however, contends that it is the nature of the discharges, and the nuclear pollution thereby caused, not the amount of the discharges, that puts the UK in breach of its UNCLOS obligations. However, if the quantum and effect of discharges is to be taken into account, regard must be had to the present state of nuclear contamination in the Irish Sea, resulting, as it does, from the same deliberate policy that Ireland complains of in the present case. Regard must also be had to the fact that we are not speaking of a single discharge event. The discharges from the MOX plant are intended to be constant and ongoing and will continue for the lifetime of the plant - at least 20 years. The discharge of small amounts of liquid radioactive waste into the Irish Sea at the present time increases the existing nuclear contamination in that sea and, therefore, makes a bad situation worse.

The THORP plant and discharges.

Up to now in outlining the basic facts I have referred only to discharges from the MOX PLANT. However, these are not the only discharges into the Irish Sea that the Tribunal is requested to take into account. It is Ireland's case that, as a result of the operation of the MOX plant, reprocessing operations at the THORP plant will increase, with the result that there will be an increase in discharges to the Irish Sea from it. This question of the linkage between the operation of the MOX plant and the THORP plant is, in fact, one of the key issues in this arbitration.

Before discussing the question of the linkage between the two plants, it is necessary to briefly describe the history of the THORP plant and to explain the nature and extent of its reprocessing activities. The name THORP stands for Thermal Oxide Reprocessing Plant - THORP for short. BNFL first announced its plan to build THORP in 1974. In 1977 BNFL applied to Cumbria County Council for planning permission to build the Plant. Ultimately, after a public inquiry, approval for the construction of THORP was given in early 1978. There was no requirement at the time that an environmental impact assessment be

prepared in relation to the plant. No such assessment was ever carried out, notwithstanding the fact that it was always envisaged that part of the radioactive waste from the THORP plant would be discharged directly to the sea through the Sellafield pipeline. IN 1992, in order to operate THORP, BNFL applied to the UK authorities for new authorisations for discharges of radioactive waste to sea and air from the Sellafield site. After two rounds of public consultation within the UK, BNFL, in December 1993, was granted new discharge authorisation for the Sellafield site, to include THORP, to take effect in January 1994. THORP began operations in 1994.

Whilst the MOX plant manufactures MOX nuclear fuel, the THORP plant is a reprocessing plant. It reprocesses used or spent nuclear fuel. This spent fuel is fuel that will normally have been used in nuclear power stations to generate electricity. The primary object of the exercise is to recover or harvest the uranium and plutonium in the spent fuel. Approximately, 3 per cent of spent fuel is made up of non-recyclable waste components. In the course of reprocessing, these components are separated into discrete waste streams so that they can be effectively managed. The remaining 97 per cent (made u of 96 per cent uranium and 1 per cent plutonium) is then recovered for future use in the form of uranium oxide powder and plutonium oxide powder.

Spent fuel destined for reprocessing arrives at Sellafield from domestic or overseas customers in heavily shielded transport flasks and goes to the Receipt and Storage facility. Similarly, any spent fuel at Sellafield that is to be reprocessed goes to the same facility. In the Receipt Building, the flasks are unloaded and their inner containers are transferred to a building known as the Storage Building. There the fuel is stored under water until required for reprocessing. The water provides cooling and shielding. Actual reprocessing begins with the transfer to and subjecting of the fuel to treatment in the Feed Pond and Head End Plant respectively. In the latter, the spent fuel is cut up into short lengths. These short lengths of fuel are then fed into a dissolver. The dissolver is essentially a bath of nitric acid. It dissolves the short lengths of spent fuel. The dissolved product is then passed through a number of chemical processes. This results in the splitting and production of the three main components of the spent fuel solution, namely, a uranyl nitrate stream, a plutonium nitrate stream and a series of waste streams containing the waste products. The uranyl nitrate and plutonium nitrate streams are then converted to uranium oxide and plutonium oxide powders for storage. The liquid wastes are sent to a number of waste facilities on the site.

The operation of the THORP plant results in the discharge of liquid and aerial discharge. This fact is not in dispute. The bulk of the radioactivity discharged by the operation of the THORP plant arises from three facilities. Firstly, the Receipt and Storage Facility, including the ponds in which the spent fuel is stored before reprocessing. These ponds are open to the atmosphere. Secondly, the Head End plant, in which the spent fuel is dissolved and put into the chemical separation plant. Thirdly, the Waste Encapsulation Plant in which the stainless steel cans containing the fuel element are encapsulated into cement after being removed from the fuel elements.

Liquid discharges from the THORP plant and the storage ponds are treated before being discharged to the sea. A partial removal of isotopes is engineered during this treatment. Aerial discharges from THORP, a proportion of which Ireland contends end up in the Irish Sea, are discharged into the atmosphere through a

stack attached to the THORP reprocessing plant.

The main radioisotopes discharged in liquid form into the sea from THORP are: tritum, cobalt-60, plutonium-241, ruthenium-106, iodine-129 and caesium-137. The main radioisotopes discharged in gaseous form into the air from THORP are tritum, carbon-14, krypton-85 and iodine-129. In passing, I would mention that the MOX discharges consist of different types of plutonium and americium. Dr Frank Barnaby, one of Ireland's experts, has at pages 19-21 of his statement of evidence in Ireland's reply given estimates, in tables and otherwise, of the amounts of liquid discharges from the THORP and MOX plants into the Irish Sea. He has also given estimates of aerial discharges from both plants. Mr John Clarke of BNFL, whose statements of evidence address the issues raised by Dr Barnaby, acknowledges fully and frankly the fact of liquid radioactive discharges from the THORP plant into the Irish Sea and does not appear to take issue with Dr Barnaby where these estimates are concerned.

The Tribunal, therefore, can proceed to consider the issues in the safe knowledge that the parties agree on the fact that the operation of both the MOX and THORP plants involves and results in the deliberate discharge, through the BNFL pipeline, of liquid radioactive waste from both plants into the Irish Sea. There is, however, one very important area of disagreement between the parties where the THORP discharges are concerned. Ireland invites the Tribunal to find that there is a linkage between the operation of the MOX and THORP plants, the effect of which is to create an increase in the liquid radioactive discharges from the THORP plant to the Irish Sea due to a prolongation and intensification of use of the latter as a result of the operation of the MOX plant. The UK requests the Tribunal to find otherwise. The contends that the two plants are separate, operationally and commercially. Whilst so contending, the UK does not in fact seek to contend that there will not be further reprocessing at THORP as a result of the MOX plant operation. Rather it contends that Ireland has not proved its case on the point as future reprocessing at the THORP plant depends upon UK Government approvals that have not yet been given. We say that that is a rather thin and, in our submission, an unsustainable line of defence.

Now the MOX/THORP linkage issue, the Attorney General has already commented on. I wish to make some remarks on the same issue. The reprocessing of spent fuel at THORP produces uranium oxide and plutonium oxide. MOX fuel is made from these two substances. At its most basic level, the linkage between the MOX and THORP plants is established by this agreed fact. However, it is not even necessary to go to this basic level to prove the linkage. It appears to be incontestable that the MOX plant was specifically constructed to make use of the THORP plant plutonium output. Under the licence conditions in the Decision of 3 October 2001 authorising the operation of the MOX plant, BNFL was required to give an undertaking to the Ministers that only plutonium derived from THORP reprocessing was to be used in the MOX plant unless Government clearance was given to act otherwise. The evidence that Ireland offers to support its linkage case is set out in Ireland's Pleadings and evidence, most notably at page 52 and following pages of Ireland's memorial and at page 7 and following pages of Ireland's Reply and in the statements of evidence of Dr Barnaby and Mr MacKerron. You will also hear oral evidence from these two witnesses.

In fact, there exists ample historical evidence to demonstrate clearly that it was always the intention of BNFL that a commercial MOX plant would complement the commercial reprocessing at THORP and be

an additional source of revenue and profit. A number of examples can be provided.

Here, sir, as you will see, on page 13 I refer in dark print to a number of extracts from the annexes and these very short extracts are also in the Judge's folder. If I could briefly refer you to that and read them out, they are very short.

The first item at A on page 13, I am sorry if that is not in the text, but if you could take a note, it is at divider 8. As you will see, this is a BNFL information brief, November 1992. I wish to go to the second page and the very final section, headed "Advantages of MOX Fuel". This is 1992 that BNFL was saying:

"It is anticipated that a large amount of the plutonium recovered from the reprocessing in THORP of light-water reactor fuel for overseas customers will be manufactured into MOX fuel in the commercial scale of plant. It is anticipated that our ability to return plutonium in the form of valuable MOX fuel will also enhance the potential for securing the post-baseload reprocessing contracts for THORP. MOX fuel utilises the fissile part of the plutonium to generate electricity rather than fissile uranium. This saves customers the cost of the purchase of fresh uranium and the cost of the enrichment process necessary to increase its fissile content for use as light-water reactor fuel. Returning customers' plutonium mixed with uranium in the form of MOX fuel is politically more acceptable than returning it as pure plutonium, which, although perfectly safe and secure, causes concern to the public."

I will leave that document and go on to B at page 13. In a statement prepared by BNFL in July 1993 for the UK Secretary of State for the Environment a number of Statements to similar effect were made. This document was intended to be an economic and commercial justification for operating THORP and was so entitled, namely "The Economic and Commercial Justification for THORP". This is at divider 7 of the folder. I draw your attention to the extract which is at paragraph 8.3.6, page 284, where it states:

"The construction of a demonstration MOX fuel fabrication plant has been completed at Sellafield and BNFL plans to build a commercial-scale plant with capacity in excess of 100 tonnes per year for operation towards the end of the decade. BNFL already has contractual commitments for output from the demonstration MOX plant and indications from customers are that substantial quantities of THORP output will be returned to them in the form of MOX fuel fabricated in the commercial scale plant."

I move on to C at page 13, BNFL's Environmental Statement of October 1993 relating to the MOX plant. This is at divider 5. There is passage at page 5 of the text, but the Attorney General has already read this. That is in the preface. I, therefore, will not re-read it. It is the third paragraph in the preface. The next is at page 19 of the text, if I could just refer you to short passages in it. Paragraph 3.3 on page 19, going to the third sentence in the middle of that paragraph, rather than reading the entire paragraph:

"Sellafield is the site of BNFL's reprocessing operations and there are sophisticated facilities to deal with all types of radioactive waste, including material which is contaminated with plutonium. While much of the plutonium dioxide which will be used in the manufacture of MOX fuel assemblies is either in store or will originate at Sellafield, location of the new MOX plant at Sellafield will remove any need to transport plutonium compounds within BNFL's sites. BNFL has, therefore, decided to locate the new MOX plant at Sellafield, primarily for the following reasons. Most of the plutonium dioxide used in the manufacture of MOX fuel will be sourced from reprocessing operations at Sellafield". And that is a very strong statement

indeed.

I am moving now to page 21 of that document, still at divider 5. It is the final paragraph on that page, 3.9. "From an operational point of view, the chosen site [that is the site for the MOX plant] has the following additional advantages as a site for MOX SMP. Integrated access with THORP will allow direct transfer of plutonium dioxide with consequential transport advantages. Management and operations can be combined with THORP. Facilities, such as the discharge stack changerooms and services, can be shared with THORP". The discharge stack is, of course, the chimney to release the aerial of gaseous discharges.

If I could move on to D, at page 13, the document there, which is the Environment Agency's Proposed Decision of October 1998 on the Plutonium Commissioning of the MOX plant. That is in divider 4 of the folder, and I wish to read a short passage at 387, paragraph A4.11.

BNFL's reference economic case depends on the reworking of separated plutonium from Thorp into MOX fuel for certain foreign customers. According to the reference economic case the MOX plant would enable BNFL to provide a plutonium recycling route for these customers. The agency only has information on the benefits and detriments associated with the reference economic case and therefore can only consider justification in relation to commercial arrangements with foreign customers similar to those in the reference case.

The agency considers however that the benefits and detriments of reworking separated plutonium from Thorp into MOX fuel for UK customers could lead to a different balance of benefits and detriments".

There is another relevant extract not in the booklet at page 397 of the document, paragraph A4.92, and I simply refer you to that.

Finally if I could refer you to a document issued by BNFL in March 2001 entitled the economic and commercial justification for the Sellafield MOX plant, and the relevant extracts from this are found at divider 6 of the folder, and I wish to refer to two short passages. Page 67, 2.3.2. headed Reprocessing Work in progress at BNFL. "SMP has been built by BNFL in order to recycle plutonium separated through the reprocessing process at Sellafield into MOX fuel. BNFL has basically reprocessing contracts for the Thorp plant with European and Japanese customers and also has some post base load contracts. Many of these customers have demonstrated their intent to recycle plutonium into MOX and this market situation was known at the time the investment was initiated. This intent has been demonstrated by the past sales from MDF contracts and precontract agreements already in place for future production from MOX and letters of support received since the MDF data falsification, extracts from which appear in the second MOX market review for DETR. Since the 1999 MOX market review for DETR was prepared over 1000 tonnes of spent fuel has been reprocessed in Thorp, increasing the stock of separated plutonium at Sellafield".

If I could move on in the same document to page 69, the fourth paragraph down on that page. "The European commitment to BNFL has therefore already been demonstrated by contracts and through ongoing discussions to secure a MOX fabrication capacity for BNFL for the recycle of plutonium in the reference case. Customers in these countries have reconfirmed their commitment to receiving MOX from BNFL's MOX plant. On the basis of such contracts and discussions BNFL believes that the volume assumptions underpinning this review are robust."

Now, Sirs, it is submitted that the statements in these passages are plain and unequivocal. It is clear from them that from the outset it was intended that the uranium oxide and plutonium oxide for the MOX plant would be supplied primarily if not entirely by the output of the Thorp plant. It is of course a fact that theoretically the MOX plant could have been and still could be supplied with uranium oxide and plutonium oxide shipped in from overseas. However it seems to be absolutely clear that this was never the plan. And in any event plutonium is not now sent by sea for security reasons. According to Ireland's witness Mr Gordon MacKerron, there has not been a shipment of plutonium by sea for quite a number of years. At all material times it was BNFL's own intention that the MOX plant would be supplied from Thorp. As indicated even as recently as March 2001 BNFL was vigorously asserting that the MOX plant would be fed by plutonium from Thorp. Against this background it is submitted that it is simply incredible that the UK before this Tribunal should via the two statements of Mr Rycroft seek to make the case that there is no commercial linkage or inter dependence between the two plants. Even Mr Clarke of BNFL points out in his evidence that, as previously mentioned, the current licence for the MOX plant requires that its plutonium feedstock is to come from Thorp.

It is submitted therefore that for these and the other reasons advanced in the pleadings documents and evidence that the Tribunal should conclude that there is linkage in the sense of inter dependence between the two plants. Without Thorp there would be no MOX plant. Without the MOX plant Thorp would be unable to attract new reprocessing business. Mr MacKerron in particular will address this topic in oral evidence.

Now the effect of linkage in terms of increased discharges. The linkage between the two plants is very relevant in the context of the issues as the effect of it is to increase the overall amount of radioactive discharges to the Irish Sea. In this regard Ireland contends quite emphatically that at the time of the authorization of the MOX plant it was perfectly foreseeable and indeed intended that a likely future consequence of its operation would be additional reprocessing at Thorp. This would and will give rise to additional discharges to the sea from Thorp. As will be demonstrated later, these additional discharges, were not taken into account at the time the MOX plant was authorised.

The issue of fact that arises in this context is a simple one. It is a fact that BNFL say that there are customers with spent fuel who would wish to have it reprocessed and then have the output returned to them in the form of MOX fuel and I have referred you to concrete BNFL written evidence to that effect. Present, intended future customers intend that they should have that. In this connection the point must be made that spent fuel remains the property of its owner who is responsible for its disposal or storage. The only alternative to long term storage where spent fuel is concerned is reprocessing. The product of reprocessing, the plutonium, is not one that the owner would necessarily wish to keep, particularly for security reasons, having regard to the fact that plutonium can be used to manufacture nuclear weapons. The simpler and safer alternative is to procure the transformation of the reprocessed plutonium into MOX. BNFL itself makes the case that MOX is a safe fuel and easily transportable as it is in ceramic form and encased. It is submitted that the evidence before the Tribunal establishes on the balance of probabilities that owners of spent fuel are likely to seek to contract with BNFL to have their spent fuel reprocessed with a view to having it turned into MOX

fuel. If the Tribunal so holds it follows as night follows day that it must also hold that the consequential increase in Thorp reprocessing activity is consequential on the availability of the MOX plant facility to the customer. It therefore follows that the consequential increase of Thorp discharges results from the operation of the MOX plant.

The topic of the likely effect, in discharge terms, of the linkage between the operations of the two plants has been addressed in the evidence of Dr Barnaby and Mr MacKerron. In relation to Mr MacKerron's evidence reference should be made to the evidence given by him in the Ospar arbitration. In those proceedings Ireland was seeking access to information that had been redacted on commercial confidentiality grounds from two reports on the economic justification of the MOX plant commissioned by the UK authorities., These reports had been commissioned from PA Consulting and Arthur D Little, both international firms of accountants and consultants. Both reports concluded that the MOX plant was capable of justification on economic grounds. Ireland sought and continues to seek this information because it believes that the MOX plant is not capable of economic justification. Mr MacKerron gave evidence in support of that proposition. The UK in evidence and otherwise strenuously disputed Mr MacKerron's evidence on the point and contended that the MOX plant had a very bright commercial future.

It is possible that the UK may seek to attack Mr MacKerron's evidence in this arbitration on the basis of evidence given by him in the Ospar arbitration. Such an attack would have no merit The issue under consideration in the present context is not one as to the commercial viability of the MOX plant; rather it is one as to the effect of the ongoing commercial operations of that plant, of which the UK is supremely confident upon Thorp plant discharges.

In his evidence Mr MacKerron demonstrates that a number of German reprocessing contracts were not cancelled because BNFL was able to offer to return to Germany the reprocessed plutonium and uranium in the form of MOX via the MOX plant. As a result of these circumstances discharges from the Thorp reprocessing that might not have occurred but for the existence of the MOX plant will be greater. Further, Mr MacKerron points to the evidence given by BNFL experts in the Ospar arbitration to demonstrate that it is the firm view of BNFL that reprocessing business will be gained for Thorp.

I refer there to a section at pages 132-134 of Mr MacKerron's second statement. I was going to read it but in the interest of time I will not. The extract is at folder 9 of the folder you have and in it you will find a number of references to evidence of Dr Geoff Varley, and the Attorney General has already referred to those same extracts, and also an extract from the evidence of Mr Rycroft who will be giving evidence here and who was full of confidence regarding the wonderful future that the commercial operations at the MOX plant will enjoy in years to come, on the basis that there was lots of business out there for it. In these passages of his statement Mr MacKerron points out that if the MOX plant is to have a life span of 20 years and if it is to make 100 tonnes of MOX fuel per year, less than its capacity of 120 tonnes, it will produce in total 2,000 tonnes of MOX. Mr MacKerron calculates, and of course he is doing the best he can at the moment, that at the moment 794 tonnes of MOX could be manufactured from the stocks of foreign owned plutonium presently in stock at Sellafield. Accordingly, and assuming that all of the existing plutonium owned by foreign customers at Sellafield was in fact to be turned into MOX over half of the likely lifetime capacity of

the MOX plant is vacant. In the view of Mr MacKerron the only way in which this capacity can be filled is via new reprocessing at Thorp with follow on MOX manufacture of the reprocessing output.

We request the Tribunal to accept the MacKerron evidence on this issue. In this arbitration the United Kingdom contention that future reprocessing at Thorp requires UK Government authorization which may or may not be forthcoming is simply not a credible one. Having gone to extraordinary lengths to justify on economic grounds the proposal to operate the MOX plant, that is in the Ospar proceedings, the UK Government is hardly going to publicly undermine it by forbidding further Thorp reprocessing contracts and thereby sounding the death knell for both MOX and Thorp plants.

Sir, I wonder if this would be a convenient moment to break.

THE PRESIDENT: It is about the right time, yes. We will come back in 15 minutes.

(Short adjournment)

MR FITZSIMONS: I was going on now to the Irish Sea.

The policy of deliberately discharging radioactive waste into the Irish Sea obviously has a polluting effect on that marine environment. In addition where as a result of tidal movements some of that waste is carried into other marine areas such as the North Sea additional pollution takes place there. However, Ireland's complaint relates largely to the Irish Sea and accordingly I propose to discuss it alone. Ireland's evidence in relation to the Irish Sea, its makeup and manner of functioning, is contained in the two reports of Dr Michael Hartnett. The evidence primarily relied upon by the UK is contained in the statements of Dr Edward Hill. Both are prominent oceanographers. Happily in this area there is a wide measure of agreement between the experts on both sides. In this connection Ireland would say that the UK Counter Memorial does not give an accurate picture of the evidence of its own expert Dr Hill when discussing oceanography matters. Dr Hartnett in his second statement discusses this topic.

I draw the Tribunal's attention to plates 1 and 2 of Ireland's memorial. It is probably not necessary to go to it now, but plates 1 and 2 give you the picture of the Irish Sea and the two countries adjoining it and brings to life, if you like, anything that I might say in relation to the Irish Sea. As will be evident the Irish Sea lies to the east coast of Ireland. It is a relatively small semi-enclosed sea which is a part of the North West European Continental Shelf. It is connected to the Atlantic Ocean by narrow entrances in the north and south, through the North Channel and St George's Channel respectively. It has a surface level area of approximately 47,000 square kilometres and over 4,000 kilometres of coastline. Approximately just west of the Isle of Man the sea bottom forms a deep channel about 300 kilometres in length and 30-50 kilometres in width. This channel has a minimum depth of 80 metres and a maximum depth of over 275 metres. The total volume of the Irish Sea is about 2,400 cubic kilometres. This is equivalent to about 6 per cent of the volume of the North Sea. About 80 per cent of the volume of the Irish Sea is contained in the region to the west of the Isle of Man. There are significant river discharges into the Irish Sea from both Ireland and England.

As this case is concerned to an extent with the fate or destination of the radioactive discharges that enter the Irish Sea as a result direct and indirect of the operation of the MOX plant, the oceanographers have concentrated to quite an extent upon tidal movements in the Irish Sea. As Dr Hartnett puts it "the tides dominate motion of the Irish Sea". He goes on to say that it is impossible to understand the distribution of,

for instance, solutes and sediments or of areas of stratification without knowledge of the pattern of the tidal currents. He says that tidal currents, and to a lesser extent waves, generate turbulence that stirs the water and controls among other things the initial dispersion of contaminants.

Tidal movements in and out of the Irish Sea show a strong bi-directional flow with weather, for example storm conditions, and seasonal factors influencing the flow. According to Dr Hartnett the flow averaged over a year or longer is northward from the St George's Channel to the North Channel. The flow is weak, averaging between 2km and 5km and 8km per day. This implies that water takes at least one year to travel the full length of the Irish Sea. Having said that on a day to day basis the picture of a slow and steady flow northwards is misleading. The movement of sea water is inherently variable. Even averaged over a month the overall flow can be southward. In addition there is also a dominant current along the eastern Irish Sea coat flowing south which may be part of an overall Irish coastal current. There is also a cross directional tidal flow and Dr Hartnett refers to the body of research verifying the tidal transport of Sellafield discharges to areas of the Irish coast and even of Dublin Bay.

Recent research has confirmed a tidal phenomenon in particular to the Irish Sea. This is known as the western Irish Sea Gyre. This is a tidal system with cyclonic effects, and thus retentive effects where contaminants are concerned. This phenomenon apparently occurs in warm weather conditions, that is during the summer period until approximately October of each year. It appears that during the summer period solar hearing together with the density driven currents create a stable gyre to the west of the Isle of Man. The effect of the gyre is caused by warmer water circulating about a dome of colder denser water, creating the closed circulation feature. The density fronts around the dome are strong and prevent complete mixing of water. This in turn reduces the effective amount of water for dilution within the Irish Sea and tends to create elevated levels of radionuclides in the vicinity of the western Irish Sea gyre. According to Dr Hartnett, this gyre is highly retentive and so entraps material that enters it. As a result it is highly likely that radionuclides in both solute and sediment form emanating from the Sellafield site will be retained for a longer duration in the Irish Sea.

The existence of the western Irish Sea gyre was known well before the UK authorities actually authorised the operation of the MOX plant. Its existence has never been taken into account whether by way of environmental impact assessment or otherwise. Its existence and indeed additional recent research according to Dr Hartnett demonstrate that our understanding of water circulation in the Irish Sea is incomplete. For obvious reasons this has very serious implications in the present context, it being one where there exists a deliberate UK policy to discharge radioactive waste into the Irish Sea. Because the UK does not have adequate information or a sufficiently accurate model of water circulation and material transport about the Irish Sea, it is not in a position to fully assess or describe the effects and impacts of the gyre on Sellafield discharges. The UK cannot predict the levels of radionuclides in solutes and sediments in the western Irish Sea. if I could pause there to avoid confusion, the western Irish Sea is the coast nearest Ireland. In two of our witnesses statements the witnesses, Professor Salbu and I think also Mr Nies, reverses west and east; so I just warn you of that when you are reading the statements. They are looking at the Irish Sea from the north of Europe and I suppose east and west are different. It is a trap for the unwary.

Dr Hill for the UK does not appear to take great issue with the opinions of Dr Hartnett on the topic.

Finally in the oceanography context mention must be made of the areas of sediment containing high concentrations of radio nuclides primarily in the form of plutonium. There are different types of sediment depending on the strength of tidal currents. Sediment can be gravel, sand and mud. Mud is for obvious reasons particularly retentive. The evidence of Dr Hartnett and Professor Salbu describes these areas of sediment or hot spots. There are a number of the UK coast at Cumbria and one is situated between the Isle of Man and the east coast of Ireland. The majority of the plutonium in the Irish Sea may be in these areas of sediment. These areas can be disturbed by tides and are also open to disturbance by trawling or engineering activities. In addition, as Dr Hartnett points out, the surface of the mud areas is being constantly turned over by the resident worms and other creatures.

The UK in its submissions does not deal head on with these issues. Instead there appears to be an effort made to contend that somehow or other all of the radioactive waste that is discharged from Sellafield is simply flushed out of the Irish Sea by tidal movement and that as a result there is no problem at all. This case simply does not accord with the facts or even the evidence advanced by the UK in this area. It further does not accord with the findings of the UK House of Commons Committee or of the Ospar report referred to earlier to the effect that the Irish Sea is the most radioactive sea in the world, having some hundreds of killogrammes of plutonium in it, without mentioning the other types of radionuclides currently being found by researchers to be present in its water. In our submission the UK case on this issue an be quickly rejected.

Now the amounts of the discharges and their effect on the marine environment. The UK has sought to base its case upon what it asserts is scientific fact. it contends that it is a scientific fact that the MOX plant discharges as well as any associated increase in discharges from the Thorp plant are of no significance and cause no harm to man and to non human biota. Whilst Ireland does not accept the proposition that the task of the Tribunal is to decide what are complex scientific questions it also at the same time rejects in its entirety the UK case made to this effect. There is evidence before the Tribunal dealing with the adverse effects upon the marine environment and otherwise of the discharges that are at issue. I this regard I refer the Tribunal to the statements of evidence of Professor Salbu, Dr Nies, Dr Mothersill and Professor Liber, all Irish witnesses. Professor Salbu and Dr Nies address the question of the contamination of the marine environment by the discharges at issue. In this context I refer the Tribunal in particular to the first statement of Professor Salbu.

It will be clear to the Tribunal from the statements of the relevant experts on both sides that any consideration of this issue must start in the first place with a discussion of the history of the effects of historical discharges in so far as these have been studied. Any view as to the present or likely future position will be informed, to some extent at least, by what has happened in the past. Notwithstanding the fact that she is able to refer to such historical data and to such studies that are available, Professor Salbu emphasises that there is great uncertainty in the whole area. This uncertainty does not point to the likely absence of harm from radionuclide contamination. it is clear from her evidence that the uncertainty points to the possibility that the harm that occurs and that will continue to occur may be underestimated at the present time.

Notwithstanding the uncertainty that exists, Professor Salbu is able to point to a number of studies

that establish the existence of significant harm to the marine environment as a result of Sellafield discharges. It is helpful to refer briefly to some of these findings. Where seawater is concerned, the activity concentration of radionuclides in seawater has varied from year to year according to variable input from Sellafield differences in transport behaviour and input from remobilisation of radionuclides from contaminated sediments. Surveys have shown that notwithstanding the fact that between 1973 and 1996 discharges from Sellafield were reduced by a factor of 40, the activity concentrations for dissolved plutonium reduced by a factor of 4 only, whilst those for americium have remained constant. This finding apparently indicates that remobilisation of plutonium from sediments represents a major contribution. Further, where plutonium is concerned, studies have shown that it travels across the Irish sea in the water in suspension in particulate form. On the basis of the studies referred to by Professor Salbu, there can be no doubt about the fact that the seawater of the Irish Sea is contaminated or polluted by the Sellafield discharges. Incidentally, where seawater is concerned, Dr Nies makes comments similar to those of Professor Salbu and also makes the point that the North Sea and, by implication, the Arctic Sea receive identifiable Sellafield radionuclides from the Sellafield discharges.

Where marine organisms are concerned, Professor Salbu refers to data showing 1997 - that is the year 1997 - technetium findings, from Sellafield discharges, in shellfish, particularly lobster, to be 16,000 becquerels per kilogram, a factor of 13 times higher than the European Council Food Intervention Level for post accident, ie Chernobyl type situations. She gives the examples of breaches of this standard. She refers to a study produced in the year 2000 compiling activity concentrations of caesium, plutonium alpha, americium and ruthenium in seaweed, fish, lobster, crab, winkles and mussels from the Irish Sea sampled annually over the period 1952-1998 in the coastal areas of Cumbria. She refers to a study of 2001 which cites data from the UK Food Standards Agency on activity concentrations of, amongst others, caesium, plutonium and americium in mussels, winkles, lobster and cod. It appears that mussels and winkles accumulate these elements to a greater extent than other shellfish or fish due to their filter feeder properties. They are more likely to ingest actual radionuclide particles whilst fish are more likely to ingest radionuclide ions in the water.

In this context, Professor Salbu makes the very important point that most of the available information on radionuclides in marine organisms is related to edible parts of organisms, these being relevant to intake by man. On this basis, there has been little if any study upon the effects of discharges upon marine organisms generally. Speaking of technetium, but by inference of all radionuclides, Professor Salbu points out that little is known about the uptake of radionuclides by marine bacteria. If there is such uptake, as seems likely, technetium, or by implication, radionuclides generally, enter the marine food chain and further contamination of marine organisms will occur. It is accepted that ingestion of radionuclides can result in molecular change in humans with consequential change in DNA. There can be little doubt that the same effect is likely to be observed in marine organisms. With further research, we will no doubt learn more about the effects upon affected species in years to come.

One of the studies referred to mentioned seaweed. According to Professor Salbu, studies of seaweed in the coastal area of Cumbria in 1998 showed massive radionuclide contamination of seaweed

(200,000 becquerels per kilogram). The same study also showed lesser, but still heavy contamination of seaweed off the west coast of Scotland (30,000 becquerels per kilogram) and significant seaweed contamination in the coastal areas of Ireland (5,000 becquerels per kilogram). She points out that seaweed is frequently used as fertiliser. Sellafield discharge radionuclides enter the food chain in this way. In this regard the point can also be made that seaweed can also be used in the manufacture of cosmetics. It is used in the food industry for additives and, indeed, a certain type of seaweed is consumed as food - in Ireland, in any event, just in case that seems strange.

Professor Salbu also points out that a further pathway for the transfer of discharged radionuclides to man involves sea to land transfer. She states that more attention has been paid to this recently and refers to two studies on the topic. These studies establish that radionuclides in dissolved form or associated with particles can become airborne in sea spray and transported inland by wind. Sea to land transfer represents a potential source for inhalation and of uptake in the food chain. The latter effect can occur as a result of coastal tide washed pastures or farm land being washed by sea spray.

There is no reason to believe that the historical situation will improve. Indeed, it is likely to get worse. It is accepted that over the next number of years, liquid radioactive discharges from Sellafield are going to increase, not decrease. As Professor Salbu notes, it appears that the UK Environment Agency is prepare to permit this to happen. Greater harm will, therefore, ensue for the marine environment of the Irish Sea and for all life and the biota that reside there. The discharges from the MOX plant and the associated increased discharges from the THORP plant will be a contributor.

The UK case before the Tribunal seeks to ignore the historical and current harm caused by Sellafield discharges. Indeed, it does not even address the effect of Sellafield discharges upon the marine environment. It further ignores the fact that over the years to come, and certainly until 2006, the discharges from Sellafield will increase from their current levels. The UK almost seeks to wish away all of these uncomfortable and highly relevant facts. Instead, in the first place, the UK requests the Tribunal to consider the MOX plant discharges in isolation. That is to say as if there were no other discharges. In the alternative, and as a response to Ireland's case, that additional THORP discharges must be taken into account, it makes the same case where these combined discharges are concerned. Its case in relation to the MOX plant is based upon a UK Environment Agency estimate of 2001, that air and liquid discharges from the MOX plant should amount to 1 per cent and .0001 per cent respectively, of total Sellafield discharges. It was apparently on this basis that the Agency decided that the existing discharge authorisation would be adequate for the MOX PLANT.

The Tribunal is requested to take the view that for the purposes of these proceedings these estimates cannot be relied upon. It is reasonable to assume that these estimates came from BNFL. They are not based upon an independent survey carried out by an agency not associated with the British Government. It remains to be seen what exactly the MOX plant will produce by way of discharges. There has been no indication that it is yet working to full capacity. In addition, there is the whole question of how exactly the MOX discharges are to be assessed separately from the THORP discharges considering that the two plants physically adjoin and complement one another and have the same stack. Indeed, the entire question of how discharges from any of the Sellafield plants are in fact measured and separated one from the other is one that the Tribunal will

no doubt wonder about. All, apart from the small quantity that goes to the sea via the sewer pipe, goes into the one pipeline from which it is discharged on a continuous basis. The sea is contaminated collectively by the totality of the discharges. The UK is not in a position to say that the MOX plant and associated discharges do not pollute the Irish Sea, whilst the remainder do have an effect. To so argue would be a nonsense. The fact of the matter is that the MOX discharges, regardless of their magnitude, do have a polluting effect.

The comments just made refer only to the MOX plant discharges. At least an estimate of them is available, even if it cannot be relied upon. However, the UK has avoided giving an estimate of the additional discharges that will come from THORP as a result of increased THORP reprocessing consequent upon the operation of the MOX plant. It is a reasonable inference from this silence that, having regard to the quantities of reprocessing involved, of which evidence is before you, the amount of these additional discharges will indeed be substantial. These discharges will also form part of the totality of pollution flowing into the Irish Sea. As Professor Salbu points out, the UK Environment Agency wishes in fact to reduce discharges from Sellafield and has made some proposals in this regard. If the current level is harmless, as the UK suggest, why is there a desire to reduce them?

Professor Salbu, apart from emphasising the uncertainties and gaps in knowledge in this entire area, also refers to the fact that up to the present time the International Commission on Radiological Protection has adopted a polity of considering the issue of radiological protection in relation to man. Up to now the view was taken that if in a particular situation man cannot be harmed, no harm could be done to the environment. This appears to be the UK approach in the present case. However, as Professor Salbu points out, this approach has undergone a major change as recently as 2001. In her evidence, she quotes the text of a 2001 International Commission Radiological Protection resolution, which acknowledges a new consensus that the environment requires its own protection. It can be reasonably assumed that as a result of this change in approach more extensive research will be conducted in the future on the topic of radioactive pollution of the marine environment by discharges such as those in the present case.

Taking into account the relevant OSPAR Convention objectives, and presumably also the new consensus, Professor Salbu is emphatic in stating that additional contamination to the Irish Sea by radioactive discharges should be avoided.

Ireland does, of course, lay great emphasis upon the precautionary principle and requests the Tribunal to apply it once it finds that there will be discharges to the Irish Sea from the MOX plant with or without additional discharges from the THORP plant. In the latter regard, Ireland does, of course, say that the case for the linkage of the discharges from both plants is not just strong. It is overwhelming. In this context the Tribunal will no doubt take into account the obvious fact that Ireland cannot be expected to take a case annually over the next 20 years against the UK on this issue. In this case, Ireland seeks to protect the marine environment of the Irish Sea against discharges from the MOX and THORP plants for the remainder of their respective currently anticipated lifetimes, that is at least 20 years. If, therefore, one is to speak only of quantities of discharges, one must take into account the total, and as yet unknown, amount of relevant discharges over that period. If harm or damage is to be deemed a relevant factor, one is of course speaking of

a far longer period. the half life of plutonium is 24,435 years. When that time span has elapsed, half of the force of the plutonium will have expired. A new half life for the remainder then commences and lasts for the same period and so on. Some of the other MOX and THORP plant discharge radionuclides have similarly long half lives.

If harm or damage is relevant, this Tribunal must take into account the fact that over the next 24,435 years and well beyond the MOX and THORP plant plutonium and other radionuclides, even if discharged in small quantities at present to the Irish Sea, will be ever present to cause the most serous damage to the marine environment, its organisms and biota. The ITLOS Tribunal in Hamburg did not consider it appropriate to make an order to shut down the MOX plant on the interlocutory application but instead left it to this Tribunal to consider whether such a decision should be taken. Ireland requests this Tribunal to exercise its jurisdiction in this regard, to apply the precautionary principle and to make the appropriate order that will provide protection for the next 24,435 years and beyond to the marine environment of the Irish Sea and to its living creatures and biota. The order that will achieve this end in the present context is one that would result in the immediate closure of the MOX plant.

Where non-human biota are concerned, the evidence establishes beyond doubt that damage occurs. The UK appears to be contending that this level of damage is, somehow or another, an acceptable level of damage that Ireland and the Tribunal should tolerate or condone as being permitted by UNCLOS. Their line appears to be that BNFL (and the UK) should be permitted to get along with its money making commercial operation whilst Ireland and the marine environment of the Irish Sea should meekly endure the damage that is actually being caused, and that will be caused in the future, because the damage is not great. This is an unacceptable attitude, particularly having regard to the fact that there is no need for the discharges. As Professor Salbu points out, BNFL certainly have the technical competence to introduce clean-up procedures prior to the discharge of waste. Abatement technology is also available to deal with the problem. Finally, in this context, it can be mentioned that the UK witness, Dr Dennis Woodhead, notwithstanding his primary concentration upon the issue of harm to humans, accepts that damage is caused to marine organisms by Sellafield radionuclides. He does express the view that this damage is not significant. However, for the reasons already given, it is submitted that any such view should not make any difference to any finding of law that the Tribunal is called upon to make. The fact is that damage does occur and that should be the end of the matter.

I move now to comment briefly upon a different theme in Ireland's case. In this regard I refer the Tribunal to the evidence presented relating to the potential effects upon human health of discharges from the MOX plant and associated discharges from the THORP plant. As already heavily emphasised, it is Ireland's view that the issues in this case relate to the question of damage to the marine environment, not to that of damage to human health. Nonetheless, if the Tribunal wishes to include a human health perspective in its approach to the issues, it will find that the position as represented in the submissions and evidence of the United Kingdom is a very incomplete one. In this connection I urge the Tribunal to have particular regard to the statements of evidence of the Irish witness, Dr Carmel Mothersill. She is also to be presented as a witness by Ireland and the Tribunal will be able to make its own assessment.

Dr Mothersill addresses the topic of the effect on humans and non-human biota of low dose radiation. Dealing with the latter first, she is quite emphatic in saying that current studies in radiobiology relating to the effect and level of low radiation doses casts doubt upon the United Kingdom's assertion that damage to marine fauna in the Irish Sea from the discharges is low. The recent studies that she refers to relate to the complex topic of genomic instability and the bystander effect in radiobiological terms. The Attorney General has already referred to these phenomena. Apparently, it is known that radiation induces the phenomena of genomic instability and bystander response in man, other mammals, fish and shellfish. The level of radiation required is low. Modern science has only tested to a particular low level. It appears that below that level these phenomena may occur. Because of the very serious effect of the phenomena in question a brief word on each is warranted.

Where genomic instability is concerned, Dr Mothersill makes the point that radiation protection agencies invariably give assurances to the effect that the doses to the human population from the nuclear industry, medical exposures and the natural environment are below the level that causes cancer. However, in the past 10 to 15 years, it has become apparent that low doses of radiation can cause subtle effects in cells surviving the dose which may not become apparent for many, many cell generations. This has been established in several major studies. Apparently, when radiation hits a cell, there may not be a distinct mutational event in that cell, the parent cell, at the actual time of irradiation. If this was to happen, then the same mutation caused by the irradiation, would be passed on to all the cells that come from the parent. What actually happens is that all daughter cells of the parent cell have an increased probability of getting a totally unpredictable and random mutation somewhere in the DNA. Some may be lethal, some non-lethal. Some may even be beneficial. Some may be implicated in oncogenes implicated in carcinogenesis. The latter type of mutation is the one most relevant to man, whilst mutations in germ cells, or mutations that kill cells, are most likely to be relevant to biota.

It is Dr Mothersill's view that low dose exposure to radiation may not only facilitate the development of cancers but could also speed their progression. She is also of the view that exposure of a population of humans or biota to a low dose of radiation may also marginally increase the incidence of all diseases, including cancer and reproductive failure, where mutation is involved. We ask the Tribunal to consider the UK evidence and submissions in this context. The UK asks the Tribunal to accept UK estimates relating to the MOX plant discharges. No actual figures are available at the plant has only recently commenced operations. They seek to dispute the proposition that there will be additional Thorp plant discharges and on this basis decline to provide discharge figures for it., They do this notwithstanding the evidence of actual damage to marine organisms from current discharges. If the discharges from the MOX Thorp plant operations are to be viewed as the low dose variety the consequences as described by Dr Mothersill will ensue. In this connection Ireland again relies upon the precautionary principle. It is submitted that the present case is a clear case for the application of that principle.

Where the bystander effect is concerned the research goes back to 1954. Again delay is involved. Apparently cells exposed to low and very low doses of radiation can produce a factor that affects the survival and function of unexposed cells. What us described as a bystander factor or signal may be involved in the

inducing of cancer in unexposed cells quite sometime after the event of the original irradiation. Here too we submit that the precautionary principle has a role where the Tribunal is concerned.

To conclude on this topic, as is now evident we have actual significant damage to the marine environment and its creatures and biota. We have likely further damage to the same and to man over the years ahead. There is also a further category that cannot be left out of the equation. This is that relating to damage that may arise from accidents within Sellafield arising from the operation of the MOX plant and associated increased use of the Thorp plant. On the basis of the safety and accident record of BNFL as chronicled in the evidence future accidents giving rise to increase discharges must be considered to be likely. Where terrorist attack is concerned, whether on the MOX or on the Thorp plants or on ships travelling to and from those plants with nuclear cargoes, unfortunately the world today is a dangerous place and I leave it to the Tribunal to consider the possibilities in that context.

I move now to the somewhat more straightforward topic of transport and safety.

The penultimate area of evidence that will be referred briefly by me at this stage is that related to transport and safety. This topic is particularly relevant to the case made by Ireland in relation to the lack of cooperation provided by the UK in relation to the MOX plant. Both sides have presented witnesses on the issue and relevant aspects of the evidence will be referred to later by Professor Vaughan Lowe in the context of the legal issues that arise in this area.

I will make a small point in this regard. The Tribunal has before it statements from witnesses on both sides addressing these issues. For example the UK has presented the detailed statement of evidence from Captain Miller of BNFL. Captain Miller appears to suggest that BNFL ships and the containers carried on them are virtually impregnable. The Tribunal only has to apply its general knowledge of maritime history and indeed comment sense to this evidence to find the fallacy in it. Would that mankind could defeat the might of the ocean leaving aside what might happen in a terrorist action.

It is presumably this supreme self confidence on the part of Captain Miller and presumably BNFL that informs its policy of not giving to the Irish authorities in particular the Irish coastguards details in advance of ships carrying nuclear cargoes that are to traverse waters over which Ireland has jurisdiction, and I refer you here again - it is in the pleadings - plate 2 in Ireland's reply after page 90. That is another coloured plate of the Irish Sea and it shows the areas over which Ireland has jurisdiction. It is presumably that same supreme self confidence that informs the BNFL policy of not providing to the relevant Irish authorities the Irish coastguard details of its emergency planning for marine nuclear emergencies that may occur in Irish waters. The Tribunal will hear some short evidence from Captain Kirwin of the Irish Coast Guard and of course he has already made a statement. But he will inform you that BNFL does not even provide this information to the UK coastguard, which in the normal course of events has responsibility for responding to emergencies occurring at sea.

This arises from the fact apparently that the UK Government has vested in BNFL exclusive jurisdiction to deal with nuclear accidents and emergencies occurring at sea.

I move to the final part of my submission, the regulatory regime applied to the MOX plant. As previously indicated before completing this outline of the factual background to the dispute I wish to refer to

the UK regulatory regime applied to the MOX plant. The purpose in outlining the steps taken by the UK authorities in this regard is to create a backdrop for legal submissions to be made later by Professor Phillipe Sands.

It is not contested that radioactive nuclear waste is one of the most lethal contaminants known to mankind. It is a pollutant. The UK has total awareness in this regard and in consequence has in place the legal regime to regulate discharges from its nuclear plants and power stations. As the UK witness Mr Ian Parker tells us the disposal of radioactive waste on or from all nuclear sites in England and Wales is regulated by the UK Environment Agency under the Radioactive Substances Act 1993 as amended. Under the Act the environment agency has the power to grant authorisation for the disposal of radioactive waste from any premises, subject to such limitations and conditions that are deemed appropriate. Once an authorisation has been granted the Environment Agency keeps it under review from the compliant point of view. The Agency has the power to revoke an authorisation.

The power of the Environment Agency in this regard is not absolute. The 1993 Act vests in two Ministries, the Secretaries of State for the Environment, Food and Rural Affairs and the Secretary of State for Health, the power to jointly give directions to the Environment Agency in respect of any particular authorization. The Ministers have the power to require the agency to refer or call in any application for an authorisation to them so that they can make the decision in relation to it. The Environment Agency must comply with all Ministerial directions given under the Act. As is evident therefore the ultimate overriding power for authorisations to discharge radioactive waste rests with the UK Government acting through these two Ministers.

Whilst the Ministers and the Environment Agency have the power in relation to the granting of discharge or authorisations a different agency regulates the actual operation of nuclear installation. This agency is the Health and Safety Executive. A subdivision of this body, the Nuclear Installations Inspectorate has regulatory control over the design construction commissioning and operation of the Sellafield plants under the UK Nuclear Installations Act 1965. This agency and not the Environment Agency has the role as the regulator where the accumulation of radioactive waste on licensed nuclear sites is concerned. It therefore regulates the nuclear waste actually stored at the Sellafield site at the present time.

As the issue of storage of nuclear waste is inextricably linked with its disposal it seems extraordinary that two different agencies should have the two different roles mentioned, though of course there presumably is cooperation. It is even more extraordinary that the views of the Environment Agency in relation to the disposal of radioactive waste at sea can be overridden by members of the UK Government, the owners of BNFL. However, that is the law in the United Kingdom.

Returning to the topic of discharge authorisations there are currently six authorisations granted to BNFL in respect of the Sellafield site. These authorisations were granted under the Radioactive Substances Act 1995 and its predecessor the Radioactive Substances Act 1960. The UK witness Mr John Clarke of BNFL tells us that the two authorisations that are relevant to the discharges made into the Irish Sea are the atmosphere, are the authorisations for the discharge of liquid and gaseous radioactive waste from Sellafield dated 17th January 1994, as amended apparently by Ministerial decision on the 19th November 1999.

At paragraph 30 of his first statement of evidence Mr Clarke described an Environment Agency review of the Sellafield discharge authorisations that had taken place since February 2000. In August 2002 the Agency passed down its proposed decision on the review of Sellafield discharge authorisations to the two Ministers already mentioned. The Executive summary of this document relied upon by the UK makes no mention of discharges from the MOX plant. I should say that the UK has not put the full documents before the Tribunal. There are quite a number of references to THORP plant discharges, including specific reference to the THORP plant stack through which, as we know, MOX plant aerial discharges flow. It may be, of course, that the Environment Agency regard the MOX plant as being inextricably linked to the operation of the THORP plant and that it did not need separate treatment. The Agency is still awaiting a decision from the two Ministers on whether or not they wish to exercise their statutory powers to give directions to the Agency on the proposed decision. The fact that almost a year has passed since the submission of the proposed decision to the Ministers gives the Tribunal a flavour of the casual and offhand way that the UK treats the serious issue of discharges from its nuclear plants.

The decision to permit the commencement of operations at the MOX plant made on 3rd October 2001 involved also a decision to authorise radioactive discharges from the plant. This decision was made at the end of a lengthy regulatory process which was primarily concerned with the case for the economic justification of the proposed plant. It is instructive to briefly run through that process.

As already stated, the history of the MOX plant commenced with the submission of a planning application on 2nd October 1993 to the local planning authority, Copeland Borough District Council. An Environmental Statement prepared in 1993 was submitted in connection with the application. In passing, I mention that this Environmental Statement did not take account at all of additional THORP discharges that would result indirectly from the operation of the MOX plant. From the outset of this process, Ireland made known its concerns and objected to the plant. The planning application was an application to permit the construction of the plant. The planning authority had no jurisdiction to permit the operation of the plant or to authorise discharges from it. Planning permission was granted on 23rd February 1994. At paragraphs 3.42 and 3.43 of Ireland's Reply the planning permission granted is briefly discussed. Construction commenced in April 1994. Whilst the UK asserts at paragraph 2.19 of its counter memorial that construction was completed in August 1995, Ireland understands that construction was not, in fact, completed until 1996. Further, as already mentioned, the 1998 BNFL report appears to indicate that full completion involving fitting and equipping had not taken place at that time.

Having regard to a legal necessity to justify the operation of the MOX plant, the UK Environment Agency held a first consultation process between February and April 1997. This process addressed the issue of the "justification" of the proposed MOX plant. During the course of the consultation concerns were raised inter alia about the lack of information made available to the public on the case for the proposed MOX plant. It was decided to obtain an independent opinion on the issue and the Environment Agency appointed PA Consulting Group to carry out an independent assessment of the economic justification for the MOX plant and to prepare a report on the basis of which the public consultation could be carried out. Ireland took part in the first round of public consultation.

In December 1997 the UK published a "public domain" version of the PA Consulting Report, which excluded certain material on the grounds of commercial confidentiality. This public domain PA Report formed the basis of a second public consultation held from January to March 1998. Ireland took part in this second round of public consultation.

In October 1998 following the second round consultation, the Environment Agency concluded that plutonium commissioning, full operation and ultimate decommissioning of the MOX plant was "justified" and proposed three draft decisions on the justification of the proposed MOX plant. The proposed decisions (a) approved variations to the liquid and gaseous discharge authorisations for the Sellafield site, (b) found that the uranium commissioning of the MOX plant was justified (c) found that the plutonium commissioning of the MOX plant was justified. It is relevant briefly to refer to pertinent aspects of the draft decision. It excludes all consideration of THORP and related discharges. It focuses on collective doses to humans, rather than on environmental issues generally. In relation to environmental issues (such as the effect on wildlife) there are just two paragraphs. The opinion is expressed that in relation to wildlife the discharges from MOX alone "would have a negligible effect". The term "effect" must mean damage. Otherwise, there would be no need to refer to it or to describe it as negligible. The reference to "wildlife" may be a reference to wildlife on land. The term is not one normally used with regard to the sea. Whatever the position is in this regard, harm even if described as negligible, was therefore acknowledged. In addition, the Agency carefully appeared to indicate that the position where potential harm was concerned was more serous and certainly required further research. The relevant passage from the decision in this regard is quoted at paragraph 3.48 of Ireland's reply. Leaving the question of harm aside, the Decision made no attempt whatsoever to address the question of the protection of the marine environment or the impact of the authorisation on the concentration of radionuclides in the Irish Sea. It is reasonable to suggest that its authors were at the time completely oblivious to the obligations by then undertaken by the United Kingdom under UNCLOS.

The draft Agency decision was forwarded to the two Ministers already mentioned. In June 1999, they reached a preliminary decision to the effect that the evidence indicated that the proposed MOX plant was economically justified. However, they also decided that more information than was necessary had been excluded from the PA Consulting Report and directed that a fuller version of the report be published.

The revised PA Consulting Report formed the basis for a third public consultation which was held in July and August 1999. This revised report, though it contained additional information, was again heavily censored and was not acceptable to Ireland.

In September 1999 details of data falsification relating to safety checks at the MOX Demonstration Facility became known. We are now aware that this scandal has cost BNFL 113 million pounds. That scandal together with concerns relating to the size of the international market for MOX fuel led to a fourth public consultation. This was based upon the 1999 PA Consulting Report and two further documents prepared by BNFL on the economic case for MOX. Ireland again requested an uncensored copy of the PA Report, but was refused.

On 15 June 2001 Ireland commenced proceedings based upon provisions of the OSPAR Convention with a view to obtaining access to the information redacted from the PA Report. In the

meantime, the UK had decided to commission a further economic report from A D Little Consultants, to carry out a fifth public consultation. The report was submitted on 15th June 2001 and the fifth public consultation commenced on 27th July 2002. The A D Little report was also redacted and Ireland's request for access to the missing information was refused in September 2001. Ireland's OSPAR information claim was later amended to include a claim for the information excluded from this report also.

Following the holding of this fifth public consultation, the two Ministers already mentioned, acting on behalf of the UK, took a decision that the MOX plant was economically justified. It was also decided that a new authorisation for aerial and liquid radioactive discharges from the MOX plant was unnecessary. It was decided that the existing 1994 authorisation for the Sellafield site, as amended in 1999, would be adequate to cover the expected discharges from the MOX plant. This decision was taken on 3rd October 2001. Of a 25-page decision, three pages dealt with environmental matters and the Ministers appear to have followed the views of the Environment Agency where discharges were concerned. The Ministers did not conduct their own environmental assessment and certainly did not take into account the obligations of the United Kingdom under the provisions of UNCLOS.

The final step in the regulatory process occurred on 19th December 2001 when the UK Health and Safety Executive authorised plutonium commissioning of the MOX plant in accordance with BNFL's site licence for Sellafield issued under the Nuclear Installations Act 1965, as amended.

As already indicated to you, Professor Sands will be making legal submissions referable to this regulatory process that I have just summarised.

In completing my submission, I refer the Tribunal to the fact that throughout that same process, Ireland was refused full information as to the full facts by the United Kingdom Government. We request the Tribunal to take into account this uncontested fact when considering the attitude and approach of the UK Government to its sovereign neighbour in the context of UK UNCLOS obligations. Thank you, sir.

THE PRESIDENT: Thank you very much indeed, Mr Fitzsimons.

What is the next step?

MR BRADY: We have a choice. It is 5 o'clock. We can start the next phase of our submission, which will be dealing with the issue of jurisdiction. I think that I indicated yesterday in our meeting that I anticipated that it would be either late today or tomorrow morning. In fact, we had ordered our affairs in any event on that basis. The alternative choice is, as we are starting a fresh topic, is to deal with it in the morning. That is a matter entirely for yourselves. I just do have one other thing which I would like to bring to your attention. It is a matter that I should have mentioned while making my submission. If you would not mind going to page 36 of the submission that I put in, I am not going to read it out, but there is just one matter that I should have mentioned for the purpose of it being subsequently elaborated by one of my colleagues. It is page 36 of my submission. It is the very last paragraph in the grey and it refers to a particularly sensitive matter. I did not go into it, but one of my colleagues will go into it in greater detail and we will also go into it in greater detail in private. I just wanted to mention that in passing. It is another sensitive matter that can be dealt with subsequently.

THE PRESIDENT: Is that something that we can take now?

MR BRADY: In fairness, it is part of an overall submission, so I think that it would not be appropriate to segment it

out. With that, it is slightly after five o'clock, we are certainly willing, if the Tribunal wishes to commence our jurisdictional submissions and really we are in your hands.

THE PRESIDENT: I see the difficulty, but I think the time available is not very consequential. I would suggest that we adjourn now and you start tomorrow morning.

Thank you. We will then adjourn and resume at 9.45 tomorrow morning.

MR BRADY: Thank you, sirs.

(**Adjourned until tomorrow morning at 9.45 am**)

1